### DRAFT FINAL DETAILED PROJECT REPORT

#### SAIPAN LAGOON AQUATIC ECOSYSTEM RESTORATION STUDY

Contract No. DACA83-01-D-0014-0002



Prepared For:



U.S. Army Corps of Engineers Honolulu Engineering District Prepared By:





## Draft Final Detailed Project Report

# Aquatic Ecosystem Restoration Study at Saipan Lagoon Saipan, Commonwealth of Northern Mariana Islands

Prepared for: U.S. Army Corps of Engineers, Honolulu Engineering District

Prepared by: Environet, Inc.

1286 Queen Emma Street Honolulu, Hawai'i 96813

Contract No. DACA83-01-D-0014-0002

September 2013

#### TABLE OF CONTENTS

EXI	ECUTIVE SUMMARY	v
LIS	T OF ACRONYMS	vii
<b>1.</b> ]	INTRODUCTION	1
1 1 1	.1 Study Purpose	
	STUDY AREA DESCRIPTION	
2 2 2	2.1 Study Area Location 2.2 Study Area Description 2.2.1 Climate 2.2.2 Topography and Soil 2.2.3 Erosion 2.2.4 Regional Geology and Hydrogeology 2.2.5 Coral Reef and Lagoon Habitat 2.3 Study Area History 2.4 Historical Land Use and Population Growth 2.4.1 Aerial Photographs 2.4.2 Aerial Photograph Comparison 2.4.3 Summary 2.5 Current Land Use 2.6 Water Resources 2.6.1 Groundwater 2.6.2 Surface Water	55
<b>3.</b> ]	PROBLEMS, GOALS, AND OBJECTIVES	
3 3 3	3.1.1 Background	27 28 28 30 30 30 32 35 36 36 37
4	Stormwater Quality Investigation	41
4	Lagoon Sediment Physical and Chemical Parameters	41

5	1	
5	1	
5	1	
5	1	
5	$\boldsymbol{j}$	
	5.9.1 Least-Cost Combinations	
	5.9.2 Cost-Effective Combinations	
	5.9.3 Preliminary Incremental Cost Analysis	61
	5.9.4 Evaluation of Alternative Plans	
	5.9.5 Final Incremental Cost Analysis	
	5.9.6 Plan Comparison	
5	0 Selection of Preferred Alternative	66
5	1 Impacts of Selected Plan	
	5.11.1 Ecosystem Enhancement	
	5.11.1.1 Aquatic Ecosystem	
	5.11.1.2 Endangered Species	
	5.11.2 Water Quality	
	5.11.3 Flood Control	
	5.11.4 Recreational/Aesthetic Improvements	
	5.11.5 Recommended Local Best Management Practice	
E		
	2 Post Construction Monitoring Plan	
6.	ROJECT IMPLEMENTATION	73
6	Local Cooperation	73
/.	EFERENCES	/5

LIST	OF	TAB	LES
------	----	-----	-----

Table 1: Summary of Weather Data at Saipan International Airport	6
Table 2: Average Storm Frequencies and Intensities at Saipan International Airport	
Table 3: Population and Urban Growth Summary	
Table 4: Historical Developed Land Comparison	
Table 5: Cost Breakdown of Alternatives Retained for Final ICA	55
Table 6: Derived Variables Used to Conduct the CE/ICA	59
Table 7: Best Buy Plans, Preliminary Incremental Cost Analysis	61
Table 8: Best Buy Plans, Comparative Analysis	
Table 9: Final Incremental Cost Analysis	65
Table 10: Cost Breakdown of Preferred Alternative	67
Table 11: Post-Construction Monitoring Benchmarks and Reduction Goals	71
Table 12: Post-Construction Monitoring Risk Register	72
LIST OF FIGURES	
Figure 1: General Study Area	7
Figure 2: Watershed Map of Saipan	
Figure 3: Developed Land Within the Study Area	
Figure 4: Water Quality Violation Frequency at Garapan Fishing Dock, 1994-2002	
Figure 5: Water Quality Violation Frequency at Monitoring Stations Within Study Area,	
2004-2011	31
Figure 6: Storm Drain Outlets Within the Study Area	
Figure 7: Proposed Detention Basins and Drainage Areas	
Figure 8: All Plans, Estimated Cost versus Output	
Figure 9: Cost Effective Plans, Cost versus Output	
Figure 10: Best Buy Plans, Preliminary Incremental Cost Analysis	
Figure 11: Final Incremental Cost Analysis, Incremental Cost versus Output	
APPENDICES	
Appendix A: Environmental Assessment, Saipan Lagoon Aquatic Ecosystem Restoration S	tudy
Appendix B: Phase I Report, Saipan Lagoon Aquatic Ecosystem Restoration Study	
Appendix C: Baseline Monitoring Studies	
Appendix D: Historical Aerial Photographs	
Appendix E: Study Area Photographs	
Appendix F: Preliminary Drainage Design Report	
Appendix G: Real Estate Planning Report	
Appendix H: Cost Estimates	
Appendix I: CE/ICA Variable Calculations	
Appendix J: IWR-PLAN Tables and Graphs	
Appendix K: Post-Construction Monitoring Plan	
Appendix L: Non-Federal Coordination	
Appendix M: DQC/ATR Certifications	

This page is intentionally left blank.

#### **EXECUTIVE SUMMARY**

2 The Saipan Lagoon Aquatic Ecosystem Restoration Study is being conducted under the United

- 3 States Army Corps of Engineers (USACE) Continuing Authorities Program authorized in
- Section 206 of the Water Resources Development Act of 1986. 4 The cost sharing project
- 5 proponent, the Commonwealth of the Northern Mariana Islands (CNMI) Coastal Resources
- 6 Management Office (CRMO) is responsible for providing 35% of the project cost. The statutory
- 7 limit for Federal participation under Section 206 authority is five million dollars.
- 8 The purpose of this study is to identify and evaluate engineering solutions to restore the degraded
- 9 lagoon aquatic habitat. A number of environmental/biological investigations and studies were
- 10 conducted in order to adequately establish baseline environmental conditions within the lagoon
- and to assess the effectiveness of future remedial measures to be implemented in the watershed. 11
- 12 The results of these studies indicate that inner lagoon habitats are affected by increased sediment
- 13 and nutrient load entering the lagoon via stormwater runoff within the study area. Increased
- 14 sediment and nutrient load has led to a shift in macroalgae-dominant marine system where less
- 15 seagrass and coral species are able to thrive in. Seagrass and coral reef systems provide habitats
- 16 for numerous species of fish and invertebrates that compose a healthy marine ecosystem.
- 17 Urbanization of the inland watershed area that has occurred over the past twenty years has
- 18 dramatically increased the amount of sediment, nutrient, and contaminants discharged into 19 Saipan Lagoon via stormwater runoff. The probable future increase in urbanization of this area
- 20 would likely further degrade and have a deleterious impact on the aquatic ecosystem structure of
- 21 the lagoon.

- 22 Detention basins were considered at three locations: near the China House restaurant between
- 23 Middle Road, across from the Pizza Hut building, and Beach Road (China House site); at the
- 24 northwestern corner of the intersection of Quartermaster Road and Middle Road (Quartermaster
- 25 site); and at a site on Middle Road approximately 200 feet north of Commonwealth Road (Cock
- 26 Fight Arena site) to address the overall project objective of reducing sediment and nutrient loads
- 27 entering the lagoon. The proposed detention basins are expected to capture runoff from areas
- 28 located inland or upslope from the sites, allowing sediment and contaminants to settle out, and
- 29 then discharge the stormwater to the lagoon in a more controlled manner via underground piping.
- 30 The detention basins would significantly alleviate flooding along Beach Road as well as capture
- 31 the large volumes of fast-moving sheet flow prior to it reaching or crossing Beach Road, and
- 32 thereby significantly reduce the transfer of nutrients, sediment, and pollutants associated with the
- 33 upper watershed from being washed into Saipan Lagoon.
- 34 Based on the assumptions that any or all of the three sites could be developed concurrently, at the
- 35 no-build, two-year, five-year, or 10-year storm design level, 64 different plan combinations were
- evaluated based on their cost and expected level of benefits. Following an evaluation of all 36
- 37 combinations, based on project cost and expected output, CRMO selected a single two-year
- 38 design level detention basin at the Cock Fight Arena site with an estimated total project cost of
- 39 \$8,451,000. The selected plan will restore an estimated 70.3 acres of lagoon habitat.

1 This page is intentionally left blank.

#### LIST OF ACRONYMS

1		LIST OF ACRONYMS
2	%	percent
3	°F	degrees Fahrenheit
4	ac-ft	acre-foot
5	APC	Area of Particular Concern
6	ATR	Agency Technical Review
7	BMP	best management practice
8	CE	cost effectiveness
9	CEQ	Council of Environmental Quality
10	CFR	Code of Federal Regulations
11	CNMI	Commonwealth of the Northern Mariana Islands
12	CRMO	CNMI Coastal Resources Management Office
13	CWA	Clean Water Act
14	DEQ	CNMI Division of Environmental Quality
15	DFW	CNMI Division of Fish and Wildlife
16	DO	dissolved oxygen
17	DLNR	CNMI Department of Lands and Natural Resources
18	DPR	Detailed Project Report
19	DPW	CNMI Department of Public Works
20	DQC	District Quality Control
21	EA	Environmental Assessment
22	EPA	Environmental Protection Agency, United States
23	$ft^2$	square feet
24	GM	geometric mean
25	gpm	gallons per minute
26	ICA	incremental cost analysis
27	IWR	USACE Institute for Water Resources
28	LERRD	land, easements, rights-of-way, relocation, and disposal areas
29	LGHU	lagoon habitat unit
30	$\frac{m}{2}$	meter
31	$m^2$	square meters
32	MMT	CNMI Marine Monitoring Team
33	mg/kg	milligrams per kilogram
34	msl	mean sea level
35	NOAA	National Oceanic and Atmospheric Administration
36 37	NPDES	National Pollutant Discharge Elimination System
38	PAH PCA	polycyclic aromatic hydrocarbon
39	PCB	potentially contaminating activity polychlorinated biphenyl
40	PDT	Project Delivery Team
41	pH	hydrogen activity
42	RCP	reinforced concrete pipe
43	RSL	regional screening level
44	SSM	single sample maximum
45	SSO	sanitary sewer overflow
T.J	550	builtury be wer overriow

45

1	TMDL	total maximum daily load
2	TPCS	Total Project Cost Summary
3	TTPI	Trust Territory of the Pacific Islands
4	US	United States
5	USACE	United States Army Corps of Engineers
6	USGS	United States Geological Survey
7	VOC	volatile organic compound
8	WERI	Water and Environmental Research Institute of the Western Pacific
9	WRC	Water Resources Council
10	WWI	World War I
11	WWII	World War II

#### 1. INTRODUCTION

- 2 This Detailed Project Report (DPR) has been prepared for Saipan Lagoon, Saipan,
- 3 Commonwealth of the Northern Mariana Islands (CNMI). This report includes an assessment of
- 4 the lagoon based on the compilation of data derived from field studies conducted during the
- 5 Phase I and II of the Saipan Lagoon Aquatic Ecosystem Restoration Study, ongoing local
- 6 authority lagoon studies, and review of historical records. An Environmental Assessment (EA)
- 7 prepared concurrently with this report (Appendix A) includes a detailed analysis of the potential
- 8 environmental impacts of the preferred alternative selected in this DPR.

#### 9 1.1 STUDY PURPOSE

1

- 10 A combination of increasing population and urbanization of the West Takpochao watershed over
- the past 70 years has led to degradation of the aquatic ecosystem that makes up Saipan Lagoon.
- 12 Indicators of this degradation include changes in the density, distribution, and composition of
- seagrass communities in nearshore waters; high abundance of seasonal macro-algal growth;
- decrease in nearshore lagoon fish; degraded lagoon corals; and increased frequency of water
- 15 quality standard violations in nearshore recreational waters. Increased sediment and nutrient
- load has led to a shift in macroalgae-dominant marine system where less seagrass and coral
- species are able to thrive in. Seagrass and coral reef systems provide habitats for numerous
- species of fish and invertebrates that compose a healthy marine ecosystem. The probable future
- increase in urbanization of this area would likely further degrade and have a deleterious impact
- on the aquatic ecosystem structure of the lagoon.
- 21 Recent manifestations of lagoon degradation are of concern not only because of the deterioration
- of natural resources supported by the lagoon, but also because degradation has progressed to the
- point that the aesthetic and recreational utility of the lagoon has been negatively impacted. This
- 24 is of substantial concern considering that the lagoon is a vital component of the tourism industry
- 25 that accounts for the majority of the local economy in Saipan.
- 26 Indicators of degradation will be discussed in detail in the following sections, together with the
- 27 desired outcomes of future restoration activities, and the best possible restoration alternative for
- 28 the study area. The purpose of this study is to: (1) determine current environmental baseline
- 29 conditions of Saipan Lagoon, (2) to develop restoration alternatives, and (3) to select an
- 30 environmentally sensitive and economically feasible restoration alternative that would best
- 31 restore the degraded aquatic ecosystem structure, function, and dynamic processes to a less
- 32 degraded and more natural condition.

33

#### 1.2 STUDY AUTHORIZATION

- 34 The Saipan Lagoon Aquatic Ecosystem Restoration Study is being conducted under the United
- 35 States (US) Army Corps of Engineers' (USACE) Continuing Authorities Program authorized in
- 36 Section 206 of the Water Resources Development Act of 1996. Under this program, the USACE
- is responsible for 65 percent (%) of the total project cost (planning, design, and construction).
- 38 As the cost sharing project proponent, the CNMI is responsible for providing 35% of the project
- 39 cost. The statutory limit for Federal participation under Section 206 authority is five million
- 40 dollars. In addition to its cost sharing obligation, the CNMI is responsible for providing all land,

- 1 easements, rights-of-way, relocation, and disposal areas (LEERD) required for project
- 2 implementation, and operation and maintenance of the completed project. The CNMI may
- 3 receive credit towards its share of project cost for the value of the LEERD required for the
- 4 project. Additionally, the CNMI will receive a \$200,000 cost sharing waiver for planning and
- 5 design/construction as allowed by Section 1156 of the Water Resources Development Act of
- 6 1986.

#### 1.3 STUDY SPONSER

- 8 The CNMI Coastal Resources Management Office (CRMO) is the local study sponsor
- 9 (proponent) and represents the CNMI Government's interest on the Project Delivery Team
- 10 (PDT).

#### 11 1.4 LOCAL REGULATORY AUTHORITY

- 12 The CNMI has promulgated a number of regulations over the past 15 years to protect the
- 13 environment. Basic environmental rights can be found in the CNMI constitution that states in
- 14 Article I, Section 9, that each person has the right to a clean and healthful public environment.
- 15 The CNMI Division of Environmental Quality (DEQ) was formed "to develop and administer
- programs, including, where appropriate, a system of standards, permits, or prohibitions, to
- prevent or regulate activities concerning the discharge of pollutants to the air, land, water,
- wetlands, and submerged lands." The DEQ has set forth regulations governing earthmoving
- 19 activities in order to prevent soil erosion and to minimize pollution of marine, surface or
- 20 groundwater resources. Although the National Pollutant Discharge Elimination System
- 21 (NPDES) program has not been delegated to the CNMI, DEQ issues Section 401 Water Quality
- 22 Certifications to any project that may affect water quality. Section 401 Water Quality
- 23 Certifications are issued for all projects involving discharges, dredging, or any activity involving
- 24 wetlands. This CNMI permitting process is closely linked to the USACE Section 404 permitting
- 25 program.
- 26 The CRMO Program was developed to manage all activities within areas designated as Areas of
- 27 Particular Concern (APCs), including the shoreline (extending to 150 feet inland), lagoon and
- 28 reefs, wetlands, and industrial areas surrounding seaports. The Coastal Resources Management
- 29 Act (outlined in CNMI Public Law 3-47) was established to coordinate island development
- 30 management and specifies policies and rules that regulate activities with the potential to affect
- 31 the Saipan's resources. These resources are broadly defined in the Coastal Resources
- 32 Management Act and include marine water and associated resources, groundwater, wetlands,
- watersheds, and certain designated APCs. Prior to the initiation of any large development in the
- CNMI, the developer must obtain a CRMO major siting permit. The CRMO permitting process
- provides all of the appropriate government agencies an opportunity to inform the developer of
- 36 the various permitting requirements and general areas of concern for the proposed project.
- 37 CRMO also has an active monitoring and enforcement section that is responsible for monitoring
- activities within the APCs.
- 39 Any open discharges into waters or wetlands require a NPDES Permit from the US
- 40 Environmental Protection Agency (EPA) Region 9 Office located in San Francisco, California.
- 41 For example, the CNMI government holds NPDES permits for the discharge of treated sewage

- 1 into two locations offshore of Saipan. NPDES permits generally require extensive monitoring
- 2 and reporting, and a DEQ Water Quality Certification must also be obtained.
- 3 The CNMI Marine Monitoring Team (MMT) consists of members from the DEQ, CRMO, and
- 4 the CNMI Division of Fish and Wildlife (DFW). This interagency MMT was initially
- 5 established in 1997 to aid in understanding the current conditions of coral reefs and coral reef
- 6 resources in the CNMI. The first State of the Reef Reports prepared by DEQ for Saipan and
- 7 Rota Island (Houk, 1999 and 2000) document the baseline conditions of the reef and marine
- 8 ecosystems, and are used for future assessments and regional management recommendations. It
- 9 is the goal of the MMT to continue this long-term monitoring program to continually assess reefs
- and aquatic resources of the CNMI.

#### 1.5 ONGOING AND PRIOR STUDIES, REPORTS, PROJECTS

- 12 A number of environmental/biological investigations and studies have been conducted, or are
- ongoing, on Saipan in the general vicinity of Saipan Lagoon and are detailed in this study's
- 14 Phase I Report (Appendix B). A review of these studies identified a number of additional studies
- 15 needed to adequately establish baseline environmental conditions within the lagoon. These
- additional studies included the following and were conducted in order to fill the data gaps for the
- study area so that the effectiveness of future remedial measures to be implemented in the
- watershed and/or the lagoon can be accurately evaluated:
- stormwater quality investigation;
  - lagoon sediment physical and chemical parameter characterization;
- historical assessment of lagoon from aerial photographs;
- inshore lagoon seagrass and associated fauna survey;
- inventory of potentially contaminating activities (PCAs) in the watershed;
- groundwater investigation;
- hydrologic study of runoff processes in the watershed;
- sediment delta surveys; and
- lagoon water quality investigation.
- 28 The results of these baseline monitoring studies are included in Appendix C and summarized in
- 29 Section 4 of this report.

- 30 DEQ and the MMT have initiated two large-scale bio-criteria monitoring programs. Both of
- 31 these are very different from EPA funded bio-criteria monitoring programs in the US mainland.
- 32 Tropical marine systems are much more dynamic and harbor very different organisms than
- 33 terrestrial fresh water systems or even marine water systems in cold environments. Bio-criteria
- 34 programs set forth in the US mainland fail to provide useful techniques for application in the
- 35 CNMI. The first monitoring effort is the Saipan Lagoon Monitoring Program (DEQ and CRMO
- only), and the other is the CNMI Nearshore Reef Monitoring Program (DEQ, CRMO, and
- 37 DFW). The goal of these programs is to gather continuous data from marine systems that are

- 1 affected by water quality concerns (e.g., watershed drainages, sewage pump failures and outfalls,
- 2 and other sources of point and nonpoint source pollution). Currently, the Saipan Lagoon
- 3 monitoring effort has completed an inventory of one region of the lagoon: the study area
- 4 (extending from Quartermaster Road to Garapan Fishing Base).
- 5 DEQ has also recently completed a Section 305(b) Water Quality Assessment Report for the
- 6 CNMI (DEQ, 2010). This report was written following guidance detailed in Section 305(b) of
- 7 the Clean Water Act (CWA) and allowed determination of the following issues: (1) whether US
- 8 waters meet water quality standards, (2) the progress made in maintaining and restoring water
- 9 quality, and (3) the extent of remaining problems in the CNMI. On shore, the Safe Drinking
- 10 Water program began implementing the volatile organic compound (VOC) monitoring
- 11 requirement, as outlined in the CNMI Drinking Water Regulations in January 2000. Public
- water systems within the CNMI will be required to perform VOC testing in order to come into
- 13 compliance with these regulations.

#### 2. STUDY AREA DESCRIPTION

- 2 This section provides a description of the study area location as well as site history, including a
- 3 historical comparison of population growth in the study area. A more detailed description of
- 4 characteristics and components of the study area is included in the Phase I Report (Appendix B).

#### 5 2.1 STUDY AREA LOCATION

- 6 The study area encompasses the southern portion of the West Takpochao watershed and extends
- 7 from Quartermaster Road to the northern boundary of the Hafa Adai Hotel in the village of
- 8 Garapan (Figure 1). The study area includes the entire inland watershed that contributes
- 9 groundwater and surface water runoff to the approximately two-mile length of shoreline, as well
- as the adjacent offshore lagoon area extending out approximately 0.3 miles.

#### 2.2 STUDY AREA DESCRIPTION

- 12 The shoreline within the study area consists of a narrow sand beach. The beach mainly consists
- of loose limesand with some gravel, shell, and coral rubble, over calcareous gravel and beach
- 14 rock. These sediments are primarily medium to coarse-grained and well-sorted. The beach is
- topped at the high water mark by a strip of grasses, vines, and trees, followed by a concrete
- pedestrian pathway further inland. The 2.8-mile, concrete pedestrian walking pathway meanders
- between the narrow sandy shoreline and Beach Road. Picnic facilities, numerous trees, vehicle
- turnout areas, a memorial to fishermen lost at sea (13 Fishermen Monument), a Japanese tank
- monument, and concrete defensive bunkers built by the Japanese during World War II (WWII)
- are also found along this section of shoreline. The northern boundary of the study area contains
- an earthen pier that was built by the Japanese during their occupation during WWII on the island.
- A dilapidated barge that was formerly used as a restaurant rests firmly aground just to the south
- of this earthen pier. The southern boundary of the study area is where Quartermaster Road
- 24 intersects with Beach Road. The area to the east of Beach Road contains numerous businesses
- built on private land, including restaurants, hardware and stationary stores, car lots, and several
- 26 strip malls.

1

- Beach Road is a two lane, undivided, signaled, asphalt highway that was improved by the US
- 28 military following WWII, but was not completely paved along its length until about 1985.
- 29 Middle Road runs parallel to and about a half-mile inland of Beach Road, and was improved to a
- 30 paved, four-lane, undivided, signaled asphalt highway in about 1990. Two paved roads link
- 31 these two highways, Island Power Road to the north and Quartermaster Road at the southern
- 32 boundary of the study area. A number of coral gravel surface roads leading to small commercial
- and residential buildings are present within the study area. The slope of the land becomes
- 34 steeper above Middle Road and the watershed is broken into a series of irregular hills and valleys
- 35 containing intermittent streams.
- 36 The Coastal Resources Management Commission has delineated 11 major watersheds on Saipan.
- 37 The study area is located within the West Takpochao watershed (Figure 2). This watershed
- 38 extends along the shoreline from about 500 feet south of Quartermaster Road to the area just
- 39 north of Charlie Dock at Tanapag Harbor. The watershed extends inland to the ridgeline that
- runs up to Mount Takpochao and continues on through the Capitol Hill area.

- 1 The coastal areas of the study area are vegetated with ironwood (Casuarina equisetifolia), sea
- 2 hibiscus (*Hibiscus tiliaceus*) and a number of ornamental trees with an understory dominated by
- 3 grasses and seaside morning glory (*Ipomoea pescaprae*). The inland portions of the study area
- 4 are either paved or overgrown by scrub vegetation dominated by tangantangan (Leucaena
- 5 leucocephala), ivy gourd (Coccinia grandis), and occasional ironwood and coconut trees.

#### **2.2.1** Climate

6

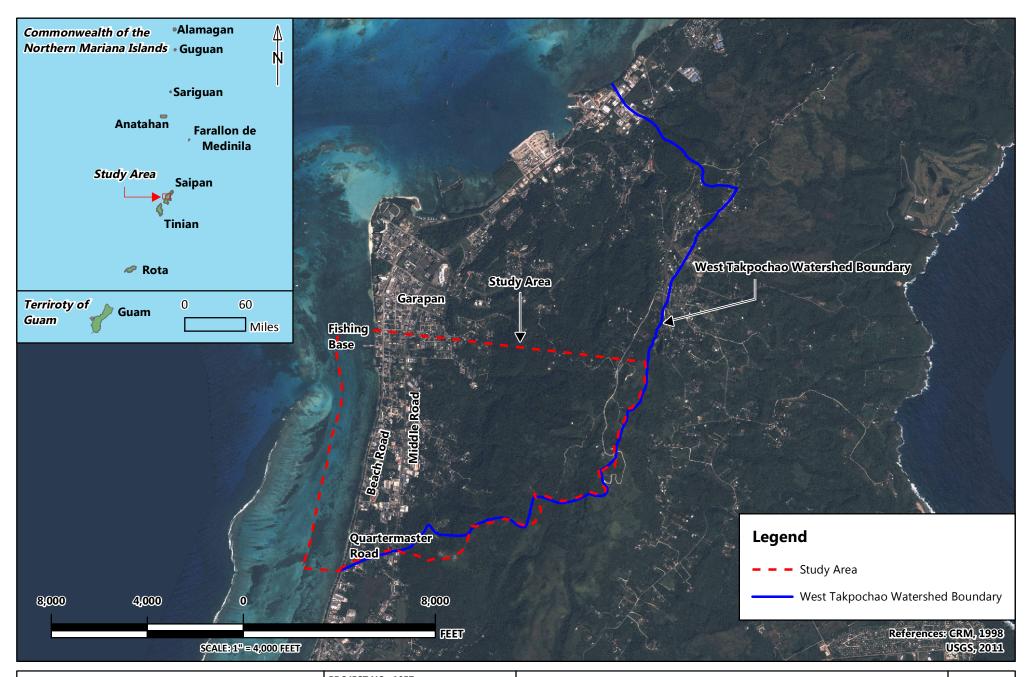
19

- 7 The climate in Saipan is warm and humid throughout the year and is classified as tropical
- 8 marine, with an average temperature between 75 to 80 degrees Fahrenheit (°F) (Van der Brug,
- 9 1985). The humidity levels are very high, with monthly averages ranging from 79 to 86%.
- 10 Typically, July to November have the highest humidity. Rainfall in the study area is seasonal
- and averages about 75 to 80 inches per year. The wet season usually extends from July through
- 12 November, followed by a dry season from December through June. Saipan experienced
- drought-like conditions during 1998, when the rainfall between January and November totaled
- roughly 41 inches, or approximately half the annual mean. Based on data collected from the
- 14 Toughly 41 inches, of approximately han the annual mean. Based on data confected from the
- weather station at Saipan International Airport from years 2007 through 2011 (Table 1), monthly average temperatures range from 79 to 83 °F. Monthly average relative humidity at the same
- station from 2007 to 2011 range from 77 to 84%. The average yearly total precipitation for years
- 18 2007 through 2011 is 73.8 inches per year.

Table 1: Summary of Weather Data at Saipan International Airport

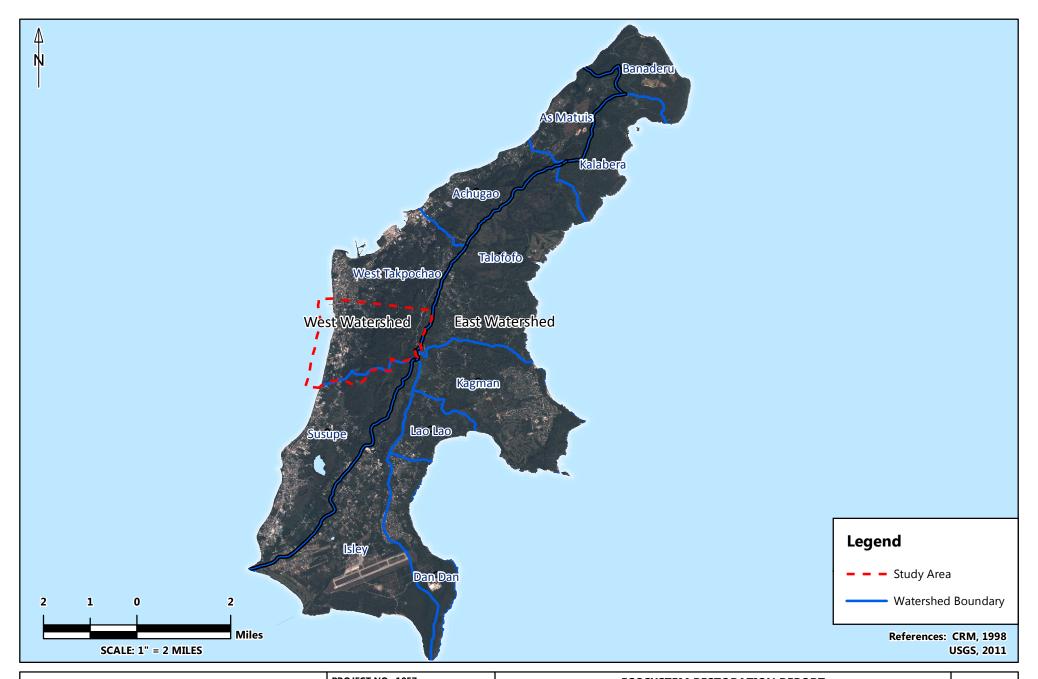
Monthly Averages for Years 2007 through 2011				
Month	Temperature (°F)  Relativ Humidi (%)		Precipitation (inches)	
January	80	77	4.2	
February	79	77	2.8	
March	79	78	3.0	
April	81	79	3.3	
May	83	77	5.6	
June	83	77	5.4	
July	82	82	7.0	
August	81	84	11.4	
September	81	84	9.4	
October	81	84	12.9	
November	81	81	5.3	
December	81	78	3.5	
Yearly Average	81	80	73.8	

Source: University of Utah, 2012



- Environet, l	Inc.
----------------	------

	PROJECT NO.: 1057	ECOSYSTEM RESTORATION REPORT	
	DATE: SEPTEMBER 20, 2012	SAIPAN LAGOON AQUATIC ECOSYSTEM RESTORATION STUDY	FIGURE
•	DRAWN BY: CB	GENERAL STUDY AREA	1
	REVIEWED BY: MA	SAIPAN, CNMI	



		PROJECT NO.: 1057	ECOSYSTE
Environet	Inc	DATE: SEPTEMBER 20, 2012	SAIPAN LAGOON AQUA
CILIVII OTICL,	IIIC.	DRAWN BY: CB	WATERS
•		REVIEWED BY: MA	!

ECOSYSTEM RESTORATION REPORT
SAIPAN LAGOON AQUATIC ECOSYSTEM RESTORATION STUDY
WATERSHED MAP OF SAIPAN
SAIPAN, CNMI

2

- 1 The CNMI are dominated by tradewinds, which blow from the east or northeast. These winds
- 2 are the strongest and most constant during the dry season, when wind speeds of 15 to 25 miles
- 3 per hour are common. The CNMI is situated some 600 miles east of an area in the western
- 4 Pacific which is the breeding ground of cyclonic disturbances. As a result, the CNMI is in
- 5 typhoon condition four (i.e., 40 mile per hour winds are possible within 72 hours) at all times.
- 6 These cyclonic disturbances can develop quickly and sometimes unexpectedly into typhoon
- 7 force winds of 120 miles per hour or greater.
- 8 During the rainy season, the tradewinds often cease, and on some days, the weather may be
- 9 dominated by westerly moving storm systems that bring heavy showers or steady, and at times,
- 10 torrential rains. These episodic, heavy rainfall events contribute the majority of the sediment and
- surface water runoff that reaches the nearshore lagoon environment.
- 12 Table 2 shows storm frequency intensities calculated from data collected from a National
- Oceanic and Atmospheric Administration (NOAA) rain gauge station located at the Saipan
- 14 International Airport from the years 1979 through 2001 (Environet, 2003). Other rain gauges
- maintained by the United States Geological Survey (USGS) as well as NOAA are located in
- various places around the island, but the airport station has recorded the most comprehensive
- data since 1979. Data quality for recent years is poor due to missing data, uncertainty of values,
- 18 erroneous data, and other factors (NOAA, 2011).

Table 2: Average Storm Frequencies and Intensities at Saipan International Airport

Storm Frequency	Rainfall (inches per 24-hour period)	Rainfall (inches per hour)	
100-year event	16.80	4.48	
50-year event	14.87	4.06	
25-year event	12.94	3.64	
10-year event	10.33	3.06	
5-year event	8.26	2.61	
2-year event	5.14	1.93	

- Table 2 does not include two large rainfall events, Super Typhoon Kim in 1986 and Typhoon
- 21 Lynn in 1987. In addition, since the gauge station is located on the southern part of the island,
- 22 rainfall recorded at this station most likely varies from rainfall in the actual study area.
- However, this data does provide baseline conditions for the intensity and frequency of rainfall
- events in the study area.

25

#### 2.2.2 Topography and Soil

- 26 The study area is situated in the western central part of the island of Saipan. The study area
- 27 potentially receives runoff and sediments from the southern half of the West Takpochao

- 1 watershed, which extends roughly two miles inland to the limestone ridge that peaks at 1,540
- 2 feet above mean sea level (msl) on the summit of Mount Takpochao. The area between the
- 3 shoreline and Middle Road is a slightly to moderately sloping coastal plain composed of 4 unconsolidated limestone-derived sediments. The area inland of Middle Road possesses the
- 5 characteristic geomorphology of the island of Saipan with slightly to moderately sloping
- topographic plateaus separated by seaward-facing scarps of emergent limestone (Cloud et al., 6
- 7 1956).
- 8 The characteristics of the surface soils generally vary moving inland from the shoreline to the
- 9 upland areas of the watershed. The lowland areas that extend from the shoreline to just inland of
- 10 Middle Road are dominated by soils of the Chinen-Urban Land Map Unit (Young, 1989). These
- 11 soils are composed of clay loam and are highly porous, accounting for the lack of natural
- 12 streambeds or continuous drainage ways across the lowland areas. During the Japanese and
- 13 German occupations, much of these lands were in intensive agricultural use. The areas upland of
- 14 Middle Road in the vicinity of Gualo Rai are covered by soils of the Kagman-Saipan Map Unit
- 15 brown clay) while further inland the land area is dominated by (thick,
- 16 Takpochao-Chinen-Rock Outcrop Map Unit (limestone and alluvial clay wash). The
- 17 Chinen-Urban Land complex (clay loam soils) in the lowlands between Middle Road and Beach
- 18 Road is the soil unit most prone to erosion in the area. However, the largest percentage of the
- 19 sedimentation that occurs along the Beach Road drainages appears to come from quarried,
- 20 crushed limestone backfill used for road and lot surfacing, rather than from erosion of the
- 21 underlying native and disturbed soils. Extensive backfill was first used in this area during
- 22 post-WW II American military construction activities. Saipan was quickly transformed into a
- 23 major military installation, to be used as a logistical and training base for subsequent invasions of
- 24 Iwo Jima, Okinawa, and Japan. The scale of the construction was massive and few portions of
- 25 the island were left untouched (Butler and De Fant, 1991).

#### 2.2.3 Erosion

- 27 Sediment transport to lowland areas occurs naturally in all island systems. In the study area, the
- 28 amount of sediments being transported to the lagoon environment has increased in conjunction
- 29 with the spreading urbanization of the lowland areas within the watershed. The increased
- 30 number of roofs, roads, and other paved areas impervious to rain increases the amount of runoff
- 31 and tends to channel the runoff between properties. Construction activities and clearing of the
- 32 natural vegetation tend to disturb and expose the natural soils, rendering them more susceptible
- 33 to sheet and rill erosion. A reduction in natural vegetation due to increased urbanization also
- 34 limits the infiltration capacity of the substrate and exacerbates runoff and erosion capacities.
- 35 The Soil Conservation Service estimated erosion rates for Saipan soils present in the Kagman
- 36 Watershed on the eastern side of the island. The average erosion rate from the forested upper
- 37 watershed is estimated to be about three tons per acre per year while areas under construction
- may exceed rates of 20 tons per acre per year. The developed homestead area in Kagman, which 38
- 39 is situated on a relatively flat limestone plateau, yields between two to five tons of soil per acre
- 40 per year. Erosion rates for the soils present within the study area are not currently available.
- 41 However, observations made during the 2011 reconnaissance field visit of eroded gravel roads,
- 42 obvious sedimentation in storm drain gullies, and occasional lapses in implementation of best
- 43 management practice (BMP) regulations at construction sites suggest that erosion rates may be

- 1 high. An attempt to evaluate sedimentation rates within the study area was undertaken by
- 2 studying deltaic deposits along the shoreline. Results of this study are discussed in detail in
- 3 Appendix C.7.

#### 2.2.4 Regional Geology and Hydrogeology

- 5 The island of Saipan, along with the other islands of the Mariana chain, is situated in a
- 6 double-arc, convergent plate margin setting. Parts of the arc are still volcanically active,
- 7 especially to the north of Saipan. Large-magnitude, deep-focus earthquakes, and volcanism are
- 8 still common throughout the northern portion of the Mariana Islands (Meijer et al., 1982). Karig
- 9 (1971) proposed a tectonic model for the evolution of this region in which volcanic arcs were
- 10 rifted to produce remnant arcs, frontal arcs, active arcs, and interarc basins. The proto-arc
- system developed as a volcanic arc upon oceanic or interarc basin crust in late-Eocene to
- mid-Oligocene time. Part of the arc was rifted to produce the Palau-Kyushu Ridge remnant arc,
- the South Honshu Ridge active arc, and the Parace Vela and Shikoku interarc basins in the
- 13 the South Housing Ridge active are, and the Farace vela and Shikoka interare basins in the
- mid-Oligocene to late-Miocene Period. The southern portion of the South Honshu Ridge was, in
- 15 turn, rifted in late Miocene time to produce the West Mariana Ridge remnant arc, the Mariana
- 16 frontal arc, the Mariana active arc, and the Mariana Trough interarc basin. The island of Saipan
- is currently located within the Mariana frontal arc while the islands to the north are located in the
- 18 Mariana active arc.
- 19 The island-arc volcanism that created the volcanic base of the islands of the Marianas chain was
- 20 characterized by pyroclastic eruptions of andesitic and dacitic composition. The majority of the
- 21 volcanic material exposed sub-aerially on Saipan was erupted in a submarine environment as the
- 22 juvenile arc volcano steadily rose above the ocean floor. These basement volcanic rocks were
- 23 placed into four formations by Cloud et al. (1956). Three of the four volcanogenic formations
- 24 (Sankakuyama, Hagman, and Densinyama) comprise the "basement" rock encountered on
- 25 Saipan. The Fina Sisu formation volcanics were placed in the middle of the stratigraphic section
- above the Matansa limestone unit. The Sankakuyama, Hagman, and Densinyama Formations
- were assigned a mid- to late-Eocene age by Cloud et al. (1956). This age assignment has been
- 28 confirmed by subsequent K-Ar (potassium-argon) age dating conducted on lava units within
- 29 these formations, yielding dates from 35.7 to 41.4 million years before present (Meijer et al.,
- 30 1982). The Fina Sisu formation was assigned a late Oligocene age by Cloud et al. (1956) based
- on a study of the microfossils present in the marine tuff units of this formation. However, Meijer
- of a stage of the interference present in the matthe tall talls of this formation. However, interference
- 32 et al. (1982) determined a mid-Miocene age (12.9 million years) for this formation by dating an
- 33 andesite lava flow exposed in a tunnel located along As Perdido Road. This younger age is
- 34 consistent with a revised fossil age determination for the Fina Sisu formation that was previously
- 35 reported.
- 36 Saipan has undergone significant tectonic uplift as a result of the flexure of the underlying outer
- edge of the Philippine Plate in response to subduction of the Pacific Plate to the east of Saipan
- 38 along the Marianas trench. Subsequent sub-aerial exposure of the volcanic basement rock led to
- 39 erosion and reworking of the original volcanic material to produce clastic sediments, which have
- 40 become cemented to form sandstones, conglomerates, and breccias of low porosity. Tectonic
- 41 uplift of the island has also exposed thick, fringing limestone units that at elevations of up to
- 42 1,540 feet above msl on the summit of Mount Tagpochau. Thus, the island consists of an
- andesitic-dacitic volcanic core overlain by sandstones, conglomerates, and breccias, which are,

- 1 in turn, capped by limestones. At present, more than 90% of the surface of the island is currently
- 2 mantled with these limestone formations and alluvium derived from the erosion of these units.
- 3 The characteristic geomorphology of Saipan (i.e., flat to slightly sloping topographic plateaus
- 4 separated by seaward-facing scarps) has been produced by episodic, upward faulting related to
- 5 the ongoing subduction process to the east of the island.
- 6 The study area is predominately underlain by the Mariana limestone unit. This limestone unit is
- 7 composed mostly of finely to coarsely fragmented, commonly coralliferous, algal, and, in part,
- 8 clayey limestone (Cloud et al., 1956). The Mariana limestone typically is white to gray colored,
- 9 moderately to cavernously porous, and non-bedded to indistinctly bedded. In the coastal
- portions of the study area, the land surface is typically covered by recent alluvium derived from
- 11 erosion of the upland limestone areas.
- 12 Residents of the island of Saipan are almost entirely dependent on groundwater as a drinking
- water source. Historically, limited amounts of generally brackish water have been exploited by
- dug wells along the coastal portion of the watershed. Potable water is extracted from deep wells
- 15 (the Gualo Rai well field) located in the more inland portions of the watershed.
- 16 Groundwater in the western portion of Saipan occurs as an unconfined fresh to brackish water
- lens that overlies saltwater. The top of the aguifer is thus bounded by the water table surface.
- 18 Groundwater flows at a moderate gradient towards the ocean, becoming more brackish near the
- 19 ocean. The base of the aquifer in the inland portions of the watershed is the westward plunging
- 20 contact between volcanic basement and overlying coraline deposits. The depth to the volcanic
- basement in the coastal portions of the study area is unknown. The regional aquifer at the study
- area is made up of the coral and coral-derived material of the Marianas Formation. Due to the
- 23 high permeability of this limestone unit, the water levels within this aquifer fluctuate with ocean
- 24 tides (USGS, 2003).

- 25 The hydraulic conductivity of the Mariana Limestone, estimated from data collected at test wells
- 26 drilled into Marianas units in the Kagman area, ranges from 290 to 2,500 feet per day. The
- 27 calculated transmissivity values for the Mariana Limestone ranged from 7,600 to 62,000 square
- 28 feet (ft<sup>2</sup>) per day. The storage coefficient of the limestone, determined at one test well location
- in Kagman, is 0.06 to 0.11; the vertical conductivity at this location was estimated to be 0.1 feet
- 30 per day (Hoffman et al., 1998).

#### 2.2.5 Coral Reef and Lagoon Habitat

- 32 A healthy lagoon environment should have low abundances of seasonal macroalgae, and high
- 33 abundances of sand and coral, with some nearshore seagrass beds. Inner lagoon habitats have
- 34 the greatest amount of seasonal macroalgae due to their proximity to nutrient rich surface runoff
- 35 from land. Outer lagoon and back reef habitats have the highest water quality and water
- movement, and are the most biologically diverse areas as a result.
- 37 The Saipan Lagoon nearshore environment is generally composed of a sand and sand/silt/rubble
- 38 substrate covered by thick stands of seagrass and macroalgae with occasional coral colonies or
- 39 limestone outcrops. Heavy input of freshwater (groundwater and surface water runoff) into the
- 40 nearshore environment is conducive to dense beds of large bladed, tall (up to five feet) seagrass

- 1 (Enhalus acoroides) that are found in a 10 to 50 meter (m)-wide band along the shoreline.
- 2 Freshwater and entrained nutrients are known to enhance the growth of *Enhalus*, but excessive
- 3 nutrients are believed to promote abundant macro-algal growth that can have a negative impact
- 4 on corals and the function of the marine ecosystem (Houk and Camacho, 2010; Houk and Van
- 5 Woesik, 2008). Intermixed between stands of *Enhalus* and extending further out into the lagoon,
- often to the back reef, is the very common short seagrass *Halodule uninervis*, which covers 20 to
- 7 70% of the benthic substrate in the lagoon between the *Enhalus* beds and the coral reef.
- 8 Macroalgal abundance tends to increase from reef to shore with *Halimeda*, *Padina*, *Caulerpa*,
- 9 Laurencia, Acanthophora, and Dictyota included among the most common genera. In areas of
- high nutrient influx such as the northern end of the study area near Garapan, two types of rapidly
- growing, hair-like macroalgae, *Enteromorpha* and *Cladophora*, are dominant. The deep green
- 12 Enteromorpha and the paler Cladophora are considered nuisance algae by some because of their
- undesirable appearance and abundance along beaches and in the nearshore lagoon that are used
- 14 for tourist activities.
- 15 Corals in the inshore zone are very sparse and are characterized by scattered, small colonies of
- 16 Porites lutea and Pocillopora damicornis. Live coral cover is less than 1% overall, but some
- areas may support colonies of *Porites* and *Pocillopora* at densities of up to 5% cover.
- 18 Invertebrates conspicuous in the inshore zone include the common sea cucumber genera
- 19 Holothuria, Actinopyga, and Bohadschia, the large, blue starfish, Linckia laevigata, and the
- clam, Gafrarium pectinatum known locally as "Amsum". Lagoon fish resources include unicorn
- 21 fish (Nasinae), rabbitfish (Siganidae), mullet (Mugilidae), goatfish (Mullidae), snappers
- 22 (Lutjanidae), the emperor fish (Lethrinus harak), and silversides (Atherinidae). Juveniles of
- 23 many species may be found in the seagrass beds and local fisheries target certain groups.
- Occasional predatory species such as groupers, jacks and barracuda may also be present. Local
- 25 fishermen use these resources for both subsistence and sport. It is of common opinion that the
- 26 inshore fisheries are in decline, and information from the CNMI Department of Lands and
- Natural Resources (DLNR) would seem to support this contention (DLNR, 1998). Additionally,
- 28 fish surveys conducted by the University of Guam and DFW revealed a major decline in
- abundance of some of the major food fish groups between 1979 and 1996 in Saipan Lagoon
- 30 (Starmer et al., 2008). An island-wide market survey in 2009 documented the continued decline
- of nearshore fisheries (Houk, 2010). Specific habitat units in Saipan Lagoon have been identified
- and delineated by the MMT and are discussed in detail in Appendix C.4.

#### 2.3 STUDY AREA HISTORY

- 34 The Mariana Islands were discovered in 1521 by Ferdinand Magellan and were claimed for
- 35 Spain in 1565 by de Legaspi. By 1568, the Spaniards relocated all Chamorros living on the
- 36 Northern Mariana Islands (including Saipan) to villages on Guam in order to suppress
- 37 indigenous resistance to foreign rule. Carolinians from the outer islands of the Truk district were
- 38 the first Micronesians to repopulate Saipan in 1815 as a result of being displaced from their
- 39 home islands by a devastating typhoon. In 1899, Spain sold the Mariana Islands to the Germans,
- 40 whose primary contribution during their short occupation was the development of coconut
- 41 plantations for copra production. In 1914, the Mariana Islands were seized by a Japanese naval
- 42 fleet during the opening days of World War I (WWI). The League of Nations placed the islands
- 43 under Japanese mandate in 1920. The Japanese actively colonized and cultivated the Mariana

- 1 Islands during their tenure, triggering the first significant urban and agricultural growth on
- 2 Saipan. Roughly 32% of the land area on Saipan was planted with sugarcane by the 1930s, and
- 3 by 1937, a total of 42,000 Japanese were living on the Northern Mariana Islands. A
- 4 narrow-gauge railway was built around much of Saipan in order to transport harvested sugarcane
- 5 to the cane mill located in Chalan Kanoa. Garapan and the northern half of the study area served
- 6 as the commercial center on the island during the Japanese tenure. The Japanese heavily
- 7 fortified the island during WWII as a result of the island's strategic location in relation to the
- 8 Japanese mainland.
- 9 During WWII, US forces invaded Saipan on June 15, 1944, and successfully captured the island
- on July 9, 1944. The shoreline along the study area was heavily shelled during the invasion, as
- evidenced by the numerous live and dud ordnance that were encountered during construction of
- 12 the beach path. The military quickly embarked on numerous construction projects throughout
- 13 Saipan that required improving the existing transportation system on the island. Beach Road and
- 14 the Garapan area infrastructure were upgraded and further developed by the US Navy shortly
- after the war.
- 16 The US military government administered Saipan until 1947 when the US and United Nations
- 17 reached a trusteeship agreement that ultimately established the Trust Territory of the Pacific
- 18 Islands (TTPI), which included Saipan. The US Navy began administration of Saipan with the
- 19 establishment of the TTPI on July 18, 1947. Administration of the TTPI was transferred to the
- 20 US Department of the Interior on July 29, 1951, but was quickly transferred back to the US Navy
- 21 in November 1952. All the other Mariana Islands, except Rota, fell under the control of the US
- Navy shortly thereafter. Nearly a decade later, on May 7, 1962, the islands reverted back to
- 23 civilian control. On January 9, 1978, the Northern Mariana Islands were declared a
- 24 Commonwealth. On November 3, 1986, the Commonwealth was declared self-governing
- 25 (Farrell, 1991).
- Following a long period of relatively slow growth, Saipan underwent tremendous growth in the
- 27 1980s and early 1990s with the rise of the island's tourist and garment industries. This is
- 28 reflected in the explosive growth in the island's population during this period, from
- 29 approximately 15,000 in 1980 to over 62,000 in the year 2000 (US Census Bureau, 2000).

#### 30 2.4 HISTORICAL LAND USE AND POPULATION GROWTH

- 31 Since its establishment during the Spanish occupation in the 19th century, Garapan has
- 32 historically been the urban hub of Saipan and the Northern Mariana Islands. Japanese control of
- 33 Saipan in 1915 triggered the first significant modern population growth on the island and in
- 34 Garapan, which until then had remained relatively small, consisting predominantly of Caroline
- 35 islanders, Chamorros from Guam, and a few German settlers during the short German
- occupation (1899-1914). The Japanese occupation of Saipan during WWI brought thousands of
- 37 Japanese migrants, predominantly from Okinawa. Soon followed the development of intense
- 38 economic and agricultural activity on Saipan, with Garapan serving as the economic and social
- 39 center. By the 1930's, Garapan had evolved into a highly developed urban society, with urban
- 40 services capable of sustaining its population to Japanese standards. The city included retailers,
- 41 restaurants, bars, and factories from which products were exported as well as consumed locally.

- The population of Saipan grew steadily to approximately 30,000 by the end of WWII and the American invasion (Ono et al., 2002).
- 3 During the American invasion, Garapan was almost completely destroyed. Large areas of the town were completely leveled and replaced with cleared areas used for the construction of 4 5 military storage buildings and for military activities. The street patterns of Garapan that had 6 been established by the Japanese and the Germans were completely changed to fit American 7 military standards. The nearshore area between Beach Road and Middle Road was graded and 8 filled using coral limestone fill taken from nearby quarries to provide level surfaces for military 9 structures. It is estimated that approximately 75% of the coastal band within the study area 10 consists of "artificial fill", a predominant remnant of this post-war development. With the 11 departure of the Japanese and the end of the industrial and agricultural commerce, the population 12 decreased significantly after WWII, from 31,629 in 1944 to 4,898 in 1949. From 1949, the 13 population increased slowly but steadily, reaching approximately 20,000 in 1989. 14 introduction of garment factories during the 1990s, together with the rise of tourism, brought an 15 influx of laborers to Saipan, causing the population to explode to over 60,000 by 1999. At its 16 peak, there were 36 garment factories on Saipan which employed over 15,000 contract workers 17 mostly from Southeast Asian countries; however, there are currently no garment factories in 18 operation on the island with the last one having closed in 2009 (Goodridge, 2009). 19 population of Saipan as of the 2010 census is 53,883 (US Census Bureau, 2010). The closure of 20 garment factories on the island may have contributed to the slight decline in population.
- In an effort to document changes in land use within the study area over time, historical aerial photographs were collected, viewed, and compared. Aerial photographic coverage of this area is limited, but decent quality photographs from 1944, 1945, 1956, 1969, 1976, 2000, and 2009 were obtained and used for this analysis. Aerial photographs are included in Appendix D. Table 3 summarizes the changes in population growth for Saipan during the periods that each aerial photograph was taken.

1

5

6

7

8

15

**Table 3: Population and Urban Growth Summary** 

PHOTO DATE	RULING GOVERNMENT	APPROXIMATE POPULATION	*PERCENT URBAN COVERAGE OF STUDY AREA
1944	Japanese Trust Territory	31,129	15%
1945	United States Naval Military Government	No Data	71%
1956	Unites States Trust Territory	6,000	15%
1969	Unites States Trust Territory	10,000	17%
1976	Unites States Trust Territory	13,000	12%**
2000	Unites States Commonwealth	62,392	37%
2009	Unites States Commonwealth	53,883	43.5%

\*For this table "Study Area" includes the area bordered by the shoreline to the west, Middle Road to the east, and stretches from Garapan Fishing Dock to the north and Quartermaster Road to the South. The entire area is 260 acres. The percent urban coverage was calculated by using Autocad to calculate the areas of polygons drawn around urban areas on each of the historical aerial photographs within the area defined above. The percent urban coverage for the 2009 aerial photograph was calculated using ArcGIS.

\*\*The 1976 photo shows only a partial view of the study area; the percent urban coverage was calculated using the study area that is visible in the photograph.

- 9 Detailed descriptions of the aerial photographs, obtained for the time period extending from 1944
- 10 to 2009, are provided in the following sections. Major land-use changes observed in these
- photographs are summarized in Section 2.4.3. An emphasis on comparison of vegetative ground 11 12
  - cover pervades this historical analysis in an effort to link changes in exposed terrestrial areas
- 13 with changes in the lagoon environment. Interpretation of apparent changes within the lagoon
- 14 environment is discussed in further detail in Appendix C.3.

#### 2.4.1 Aerial Photographs

- 16 February 23, 1944. Black and White Aerial Photograph (Source: Bishop Museum, Honolulu,
- 17 Hawaii).
- 18 This photograph was taken by military reconnaissance during the Japanese occupation prior to
- 19 the American invasion. The population during this time was inflated due to the large number of
- 20 Japanese armed forces stationed on the island.
- 21 Visible in this photograph is the shoreline extending from just north of Garapan Fishing Dock to
- 22 the Susupe area to the south. Coverage extends inland approximately one-half mile, beyond the
- 23 present day Middle Road location. This photograph also includes offshore coverage of the
- 24 lagoon, nearly to the outer reef. The quality of this photograph of the study area and the
- 25 nearshore lagoon is good, with just a small portion of the lagoon obscured by cloud cover.

- 1 A dense band of development, extending from Garapan to the Gualo Rai area, is visible in this
- 2 photograph. The area appears to be highly urbanized, with an advanced street and block system
- 3 extending south from Garapan to the Gualo Rai area. Development in the area between the
- 4 shoreline and the approximate current location of Middle Road consists of very densely arranged
- 5 building structures and roads with little or no vegetative land covering. Further inland, bordering
- 6 this highly developed area, are areas that are cleared of trees and appear to be agricultural land.
- 7 Land located south of the development, in the areas of present day Quartermaster Road and
- 8 Susupe, consists mainly of agricultural land with little urban development.
- 9 Offshore coverage of the lagoon extends to just inside the outer reef. The lagoon is characterized
- 10 by a nearshore, light colored band that is assumed to be an area devoid of shallow water
- 11 vegetation or which is covered by sediment deposited from surface runoff. An adjacent dark
- 12 colored band that appears to be some kind of seagrass or algae extends from the nearshore
- sand/sediment band approximately one eighth-mile offshore. At this point, there appears to be
- striations in the lagoon bottom and a distinct contrast between the sea vegetation band, indicating
- an area of high energy or current that flows to the south.
- 16 May 9, 1945. Black and White Aerial Photograph (Source: University of Hawaii, Honolulu,
- 17 Hawaii).
- 18 This photograph was taken after the American invasion of Saipan, at which time large areas of
- 19 land were cleared and used for US military installations. The population of the island was still
- 20 impacted by the large transient military population.
- Visible in this photograph is the shoreline extending from just north of Garapan Fishing Dock to
- 22 the Susupe area to the south. Coverage extends approximately one and one-half miles inland.
- 23 This photograph also includes offshore coverage of the lagoon, to the outer reef on the lower half
- of the photograph and to just beyond the fishing dock in the upper portion of the photograph.
- 25 The quality of this photograph is good. The photograph was taken from an altitude of
- approximately 5,000 feet roughly eleven months after the American invasion of Saipan.
- 27 The study area appears significantly altered compared to the 1944 pre-invasion photograph. The
- 28 previously existing band of development, including structures and streets, has changed
- dramatically. Middle Road, Beach Road, and Quartermaster Road, as they appear today, are
- 30 visible and were apparently constructed by US forces shortly after the American occupation of
- 31 the island. The densely arranged, small building structures and street grid visible in the 1944
- 32 photograph are replaced by large tracts of cleared land covered by large military warehouses and
- 33 storage containers. The cleared land extends into the Gualo Rai area and to the inland side of
- 34 Middle Road to the south, for the entire extent of the study area.
- 35 This photograph shows a band of what is probably *Enhalus* seagrass nearest to shore. This black
- 36 band extends out to the deeper mid-lagoon region. The assumption is made that the *Enhalus*
- 37 seagrass region, similar to all other photographs, extends only a couple hundred meters off-shore.
- 38 The remaining portion of the black band in the 1945 image is probably *Halodule* seagrass or
- macroalgae stands. An additional bed of *Halodule* seagrass or macroalgae near the lighthouse in
- 40 the outer lagoon is shown in the image. This is significant because the deeper mid-lagoon region

- 1 is associated with stronger currents and tidal exchanges. These events would theoretically
- 2 exchange high nutrient lagoon waters before they reach the outer lagoon. The large stand of
- 3 seagrass present in the 1945 image suggests that nutrient rich groundwater may have been
- 4 affecting aquatic communities of the outer lagoon within the study area.
- 5 The beach/nearshore lagoon area is characterized by tracks in the lagoon floor that may be
- 6 remnant landing craft tracks from the invasion. There are several sediment deltas visible along
- 7 the shoreline, most likely a result of the large scale clearing for reconstruction. The dark band of
- 8 sea vegetation appears to be of equal width as the previous photograph and extends to the same
- 9 high energy-current band located inside of the reef.
- 10 December 9, 1956. Black and White Aerial Photograph (Source: University of Hawaii,
- 11 Honolulu, Hawaii).
- 12 This photograph was taken following the designation of Saipan as a Trust Territory of the United
- 13 States. The population and development reflect the relatively small population of permanent
- residents, with the military population having left with the closure of the last military installation
- 15 in 1950 (Spoehr, 2000).
- Visible in this photograph is the Saipan shoreline extending approximately from the Gualo Rai
- area to just south of Quartermaster Road. Coverage extends inland just beyond Middle Road.
- 18 This photograph also includes offshore coverage of the lagoon, to an extent of approximately
- 19 one-quarter mile. The quality of this photograph is good and it was taken from an altitude of
- approximately 1,500 feet.
- 21 The study area appears far less developed than in the invasion-era photographs. Areas that
- 22 previously appeared as exposed soil are now covered by vegetation. Vegetation appears to
- 23 consist predominantly of underbrush with sparse trees. Some of the warehouses, and cleared
- areas associated with the warehouses that were built in 1945, are still visible, but are overgrown
- with vegetation. Beach Road, Middle Road, and Quartermaster Road are visible.
- The lagoon appears to have changed, with a relatively small band of sea vegetation visible along
- 27 the shoreline. Sediment deltas are visible along the shoreline. The remaining portion of the
- 28 lagoon that is visible is sparsely vegetated and is characterized by a lighter albedo, which
- 29 probably reflects the presence of a relatively barren sandy lagoon floor. The high level of
- seagrass and macroalgae development is absent in this image. A band of *Enhalus* seagrass is still
- 31 visible in areas close to shore. The seagrass and macroalgae growth extending from shore to the
- 32 mid-lagoon region that was visible in the 1945 photograph is no longer visible. There is also no
- visible large development of seagrass or macroalgae in the outer lagoon that was previously
- present. The majority of the lagoon visible in the photograph consists of a barren sandy bottom,
- 35 which requires lower levels of nutrients in runoff water and groundwater to maintain. This is
- 36 consistent with the diminished level of onshore development present in the study area. Nonpoint
- 37 sources of pollution such as unpaved roads, and other sediment and nutrient sources within the
- 38 study area were not as widespread compared to the photograph taken in 1945.

- 1 January 29, 1969. Black and White Aerial Photograph (Source: University of Hawaii,
- 2 Honolulu, Hawaii).
- 3 This photograph was taken at a time of gradual increase in development/population of Saipan.
- 4 Visible in this photograph is the shoreline extending from Garapan to south of Quartermaster
- 5 Road. Coverage extends approximately one-half mile inland, beyond the present-day Middle
- 6 Road location. This photograph also includes offshore coverage of the lagoon, well beyond the
- 7 outer reef. The photograph was taken from an altitude of approximately 4,500 feet and is of
- 8 good quality.
- 9 The terrestrial landscape within the study area reflects little change from the 1956 photograph.
- 10 Development along the shoreline appears to be relatively unchanged other than advanced
- overgrowth of some of the WWII remnant structures.
- 12 The lagoon vegetation growth pattern appears to be unchanged, with sparse vegetation spots
- visible in a nearshore band, but little else extending to the outer reef. The visible sediment deltas
- also appear to be unchanged.
- 15 **February 23, 1976**. Black and White Aerial Photographs (Source: University of Hawaii,
- 16 Honolulu, Hawaii).
- 17 This photograph includes coverage of most of the study area, extending from Garapan Fishing
- 18 Dock to just south of Quartermaster Road. Onshore coverage is limited in these photographs,
- extending inland to Middle Road in the southern half of the study area, but extending only just
- beyond Beach Road in the northern half. This photograph also includes offshore coverage of the
- 21 lagoon, extending to just beyond the outer reef in the southern portion, and to just inside of the
- 22 outer reef in the northern half. The quality of this photograph is good, with slight cloud
- interference in the center of the area.
- 24 The continuation of gradual population/development growth is evident in this photograph.
- 25 Although coverage is limited, it is evident that there is more land development along Beach Road
- 26 than in the 1969 photograph. The density of urbanization is not at the level that it was in the
- 27 1940s, but it appears to be increasing. The lagoon appears unchanged from the 1969 photograph.
- April 25, 2000. Color Aerial Photograph (Source: R.M. Towill, Honolulu, Hawaii).
- 29 This photograph depicts present-day population/development levels. Saipan's status as a Trust
- 30 Territory of the United States, coupled with non-stringent labor laws, created the opportunity for
- 31 garment companies to produce clothing using cheap labor while still printing "Made in the USA"
- 32 on the labels. The rise of the garment industry in Saipan in the early 1990s brought a rapid
- 33 increase in population to the study area that has continued through the 1990s, raising the
- population from approximately 20,000 in 1989 to approximately 60,000 in 2000 (Farrell, 1991).
- 35 Visible in this photograph is the shoreline extending approximately from the Gualo Rai area to
- 36 just south of Quartermaster Road. Onshore coverage extends inland to just beyond Middle Road.
- 37 This photograph also includes offshore coverage of the lagoon, to an extent of approximately

- 1 one-quarter mile. The quality of this photograph is good and was taken from an altitude of
- 2 approximately 1,500 feet.
- 3 This photograph depicts present-day levels of development in the study area. The tract of land
- 4 between Beach and Middle Roads is significantly more developed than in the 1976 photograph.
- 5 Vegetation is still prevalent among many of the structures, unlike in the 1940s photographs.
- 6 Major terrestrial changes include the presence of a bike path constructed on the shoreline-side of
- 7 Beach Road and stretching the entire length of the study area, and the widening and pavement
- 8 improvement of Middle Road. Overall, the level of on-shore development closely resembles that
- 9 of the late Japanese era.
- 10 Nearshore sea vegetation consists of the relatively narrow, dark band of vegetation observed in
- 11 previous photographs. The remaining visible segment of the lagoon appears to have sparse
- 12 growth of sea vegetation. Several sediment deltas are visible at stormwater outfall locations.
- 13 The 2000 image shows the most resemblance to the 1945 image in terms of seagrass and
- macroalgae stands, and onshore development.
- 15 May 24, 2009. Color Aerial Photograph (Source: Google Earth 2009).
- 16 This photograph shows the most recent image of the study area from Garapan Fishing Dock to
- 17 just south of Quartermaster Road. Onshore coverage extends inland to just beyond Middle Road.
- 18 Although the southernmost portion of the study area is slightly obscured by cloud coverage, the
- 19 overall quality of the image is good.
- 20 As with the 2000 aerial photograph, this photograph depicts present-day levels of development in
- 21 the study area. Areas cleared of vegetation and paved areas have increased since 2000.
- 22 The narrow, dark band of nearshore sea vegetation and the relatively sparse growth of sea
- 23 vegetation in the remaining segment of the lagoon are consistent with the 2000 aerial
- 24 photograph, as well as with the 1945 aerial photograph. Sediment deltas are visible at the
- 25 stormwater outfall locations. The *Halodule* and macroalgae stand development in the outer
- lagoon near the lighthouse that was visible in the 1945 photograph is again visible in this
- 27 photograph. This appears to support the argument that increased onshore development (which
- leads to increased sediment/nutrient loads to the lagoon) results in altering the marine system by
- 29 stimulating *Halodule* and macroalgae growth.

#### 30 **2.4.2** Aerial Photograph Comparison

- In an effort to determine how land use has changed over time in the study area, the area of
- 32 developed land, including land cleared of vegetation (i.e., roads, buildings, and bare lots) visible
- 33 in each of the historic photographs was calculated. Coverage of the study area in each
- 34 photograph varies, and in some cases is incomplete; therefore, land areas calculated are general
- 35 estimates. The land area used for the comparison includes the area bordering the fishing dock to
- 36 the north, the lagoon shoreline to the west, Quartermaster Road to the south, and Middle Road to
- 37 the east. The purpose of this calculation is to compare sediment contributory areas within the
- 38 study area during recent history. Areas devoid of vegetation that are unpaved tend to contribute
- 39 greater amounts of runoff, and facilitate sediment transport than comparably sized areas that are

- 1 covered by natural vegetation. Cleared paved areas minimize sediment contribution, but
- 2 contribute excessive rainfall runoff to the shoreline. Middle Road and Quartermaster Road were
- 3 first constructed after the American occupation, and are thus not visible in the 1944 photograph.
- 4 Table 4 and Figure 3 depict the comparison of land use from 1944 to 2009.

_		
<b>^</b>		
J		

**Table 4: Historical Developed Land Comparison** 

YEAR	DEVELOPED/DE- VEGETATED LAND (ACRES)	COMMENTS
1944	40	-
1945	185	-
1956	40	Partial Photograph Coverage
1969	45	-
1976	32	Partial Photograph Coverage
2000	95	-
2009	113	-

6

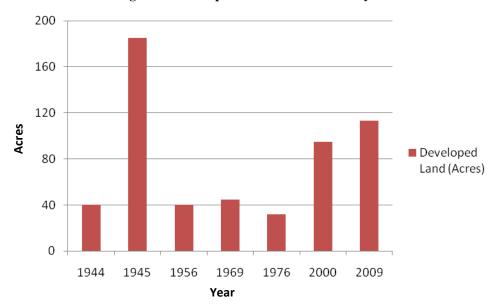
8

9

10

11 12

Figure 3: Developed Land Within the Study Area



#### 2.4.3 Summary

During the Japanese occupation, Garapan was densely developed by structures and a street grid, and stretched into the northern portion of the study area. Dense development extended approximately to the southern end of the Guala Rai area, south of which consisted of land used primarily for agricultural purposes. The present day land use pattern and development of the

- study area stemmed from the American occupation of Saipan during WWII. This is evidenced
- 2 by the clearly visible Beach Road, Middle Road, and Quartermaster Road in the photograph
- 3 taken in 1945. The 1956 photograph depicts much of the WWII development to be overgrown
- 4 with vegetation, though the northern-most portion of the study area is not visible. Between the
- 5 1950s and present day, development of the study area has steadily increased, with a large
- 6 population growth spike during the 1990s from garment factory development, though the area of
- 7 land devoid of vegetation is still significantly less than what was present in 1945 during the
- 8 American occupation of Saipan.
- 9 Vegetation consisted only of the agricultural land in the 1944 photograph, with very little natural
- 10 vegetation present within the study area between present day Beach Road and Middle Road. The
- study area in 1945 was vastly changed with respect to building structures and roads, but the
- vegetation remained relatively unchanged, other than the advancement of overgrowth on land
- 13 formerly used for agriculture. The 1956 photograph shows the further advancement of natural
- 14 vegetation over the land formerly cleared during WWII. The vegetation growth pattern has
- 15 remained relatively unchanged to the present day, with the overgrowth primarily consisting of
- shrubs with a canopy of larger trees in some areas.
- 17 The shoreline, specifically the beach, is characterized by deltas of sediment deposits at entry
- 18 points of surface water runoff. These deltas are visible in all of the photographs, fluctuating
- minimally in size depending on the year. The beach appears to be at its widest in the 1945
- 20 photograph, while it seems to have remained relatively unchanged in the 1956, 1969, and 1976
- 21 photographs. There seems to be an increase in the size of the sediment deltas in the 2000
- 22 photograph, although there is a decrease in the overall width of the beach in comparison to the
- 23 1976 photograph. This is most likely the result of the construction of the beach path along the
- shoreline that acts as a barrier or armor, inhibiting the regeneration of the beach from eroded
- sediments. The increased size of the sediment deltas can be attributed to the increased sediment
- load entering the lagoon as a result of urbanization within the study area. Minimal changes are
- observed between the 2000 and 2009 aerial photographs, except for the increase in urbanized
- areas along Beach Road and Middle Road in the 2009 image.
- 29 The aerial photographs are of varying quality and scope, and some general trends can be deduced
- 30 from their review. Increasing urbanization within the watershed has led to the exposure of more
- 31 sediment, leaving the area susceptible to erosion and increasing the sediment load transported to
- 32 the lagoon during rainfall events. Lack of a stormwater control and/or treatment system has left
- 33 the lagoon susceptible to nutrient and contaminant-laden sediment, decreasing the overall quality
- of the lagoon environment.

#### 2.5 CURRENT LAND USE

- 36 The two major thoroughfares on Saipan, Beach Road and Middle Road, run through the study
- area, with the majority of urban development in the area concentrated along these two roads.
- 38 The watershed area inland of Middle Road is predominately covered by forest vegetation, with
- 39 the exception of the Gualo Rai community. The areas immediately adjacent to and in between
- 40 Beach Road and Middle Road are the currently most heavily developed areas within the study
- 41 area. These areas are where most of the PCAs within the study area are located (see Appendix

- 1 C.5). There is great potential that the entire land area between these two roads will become
- 2 heavily urbanized within the next decade due to its close proximity to the island's commercial
- 3 and governmental center in Garapan, and to meet the demands of a rapidly increasing island
- 4 population.

#### 5 2.6 WATER RESOURCES

- 6 Saipan has unique water issues that offer challenges to regulatory agencies such as the CNMI
- 7 DEQ and CRMO. Finite freshwater sources and impacts of urban development on surrounding
- 8 marine environments are of constant concern. Decreased water quality threatens marine
- 9 environments because coral reefs and other marine systems rely on good water quality for proper
- 10 function and prosperity. This section summarizes general water characteristics on Saipan
- according to the CNMI DEQ Integrated 305(b) and 303(d) Water Quality Assessment Report,
- 12 dated November, 2010 (DEQ, 2010).

#### 13 **2.6.1 Groundwater**

- 14 Two types of aquifers are dominant on Saipan, isolated limestone aquifers and the more
- prevalent basal aquifer, which serves as the predominant source of freshwater on the island. Due
- 16 to limited freshwater sources, the location and distribution of these aquifers is of extreme
- importance in the CNMI. Urban growth and an increase in population have led to several issues
- that threaten the freshwater aquifers. Increasing demand of freshwater has led to over-pumping
- of the basal lens aquifer, causing high chloride levels due to saltwater intrusion.
- 20 Although most occurrences of groundwater contamination in Saipan have not been linked with a
- 21 specific identifiable source, the highly suspected sources, in addition to saltwater intrusion,
- include the following:
- petroleum compounds from underground storage tanks;
  - pesticides, halogenated solvents, petroleum compounds, nitrate, metals, bacteria,
- protozoa, and viruses from disposal activities at landfills;
- nitrate, bacteria, protozoa, and viruses from septic tanks, as well as pipelines and sewer
- 27 lines; and

24

- halogenated solvents, petroleum compounds, and metals from small-scale manufacturing
- and repair shops.
- 30 These point and nonpoint source pollution due to heavy urbanization can threaten groundwater
- 31 sources through infiltration of the study area's highly permeable top soils.

#### **2.6.2 Surface Water**

- 33 The CNMI has designated two classes of water (AA and A) for marine uses. AA represents
- 34 high-quality waters that are considered to be in a "natural" and "pristine" state. The CNMI
- 35 Water Quality Standards state that "to the extent practicable, the wilderness character of such
- areas shall be protected," and does not permit any discharge of pollutants into class AA waters
- 37 (DEQ, 2002a). Class A waters have been designated in two parts of Saipan, and generally
- 38 represent a slightly lower quality of water in which some discharges may be permitted, for

- 1 example, the two sewage treatment plant outfalls on Saipan. Nevertheless, Class A waters must
- 2 support recreational use and the propagation of fish, shellfish, and wildlife. Strict water quality
- 3 standards have been set for the protection of these uses in Class A marine waters. Additionally,
- 4 further protection is afforded through the CNMI Anti-Degradation Policy, which is part of the
- 5 Water Quality Standards and protects existing uses and water quality in any waters, despite their
- 6 classification.
- 7 The majority of the coastal marine waters on Saipan are designated as Class AA, including the
- 8 study area. These waters should remain in their natural pristine state as closely as possible with
- 9 an absolute minimum of pollution or alteration of water quality from any human-related sources
- 10 or actions. The uses protected in these waters are the support and propagation of shellfish and
- other marine life, as well as the conservation of coral reefs and wilderness areas, oceanographic
- research, aesthetic enjoyment and compatible recreation inclusive of whole body contact (e.g.
- swimming and snorkeling), and related activities.
- Both point and nonpoint source pollution are responsible for lowering the quality of the CNMI's
- surface waters. Sewage out-falls, sewer collection overflows, sediment from unpaved roads and
- development, urban runoff, reverse osmosis discharges from hotel treatment systems, and
- 17 nutrients from agricultural areas and golf courses are the most significant contributors to the
- degradation of the CNMI's surface and marine water quality. Surface water quality is difficult to
- measure and properly assess due to the many interrelated variables that affect surface water,
- 20 including rainfall events, tidal fluxuations, and other atmospheric and oceanographic conditions.
- According to the MMT, in order to properly and accurately assess water quality, it is best to
- 22 couple both marine habitat health data with water quality measurements. Decreased water
- 23 quality threatens marine environments because coral reefs and other marine systems rely on good
- 24 water quality for proper function and prosperity. Further discussion of the effects of degraded
- water quality on Saipan Lagoon's ecosystem is provided in the next section.

## 3. PROBLEMS, GOALS, AND OBJECTIVES

- 2 The following sections describe the existing environmental issues in the study area and the need
- 3 for a restoration alternative that would meet the study objective of restoring the lagoon to a less
- 4 degraded, more natural condition. The importance of the lagoon ecosystem to the overall health
- 5 of the Saipan marine ecosystem is also discussed.

#### 3.1 EXISTING ENVIRONMENTAL ISSUES IN STUDY AREA

# 7 **3.1.1 Background**

1

- 8 Coral reefs are one of the most ecologically significant and diverse systems found within the
- 9 natural environment. Coral reefs provide habitats for 25% of all marine fish species although
- they cover less than 1% of the Earth's surface (Burke et al., 1998). Coral reefs serve as an
- integral part of Earth's ecosystem and also support a variety of human needs such as subsistence,
- 12 fisheries, tourism and recreation, shoreline protection, and even yield compounds that are used to
- develop new medicine. At least 500 million people depend on food, coastal protection, and
- 14 livelihoods provided by coral reefs (Wilkinson, 2004). Coral reefs are also of great cultural
- importance to many regions in the world.
- 16 Under the CWA (Section 404(b)(1), Part 230), coral reefs are considered "Special Aquatic Sites",
- and "they are geographic areas, large or small, possessing special ecological characteristics of
- 18 productivity, habitat, wildlife protection, or other important and easily disrupted ecological
- 19 values. These areas are generally recognized as significantly influencing or positively
- 20 contributing to the general overall environmental health or vitality of the entire ecosystem of a
- 21 region." The CWA also states that "degradation or destruction of special sites may represent an
- 22 irreversible loss of valuable aquatic resources."
- 23 In spite of their ecological, social, and economical value, coral reefs are in decline primarily
- 24 from global climate change, impacts from unsustainable fishing, and land-based pollution.
- 25 According to the Global Coral Reef Monitoring Network, the single largest coral reef monitoring
- 26 effort in the world, of all the reefs that is monitored worldwide, 27% has already been lost, and it
- 27 is predicted that another 32% could be lost in the next 20 to 30 years (Pockley, 2000). In
- addition, a report published by the World Resources Institute states that 58% of all reefs are at
- serious risk from human development. Both of these reports point to human activities as the
- major cause of decline in reefs (Weier, 2001).
- 31 This study focuses on one of the major causes of coral reef and ecosystem degradation;
- 32 land-based pollution that ultimately reaches the nearshore waters of Saipan Lagoon, which
- 33 ultimately causes alteration of the ecological system within the surrounding area. Some of the
- most diverse and economically significant coral reefs that support many forms of sea life are
- found in the CNMI. In Saipan, not only does the reef surrounding the island provide habitats for
- 36 numerous marine species, but also provides protection from typhoon damage and erosion,
- 37 supports fish species that are consumed regularly by local residents, and are used by local
- 38 residents and tourists for recreational purposes. Further degradation of the lagoon ecosystem due
- 39 to human activities will lead to ultimate destruction and irreversible loss of valuable aquatic

- 1 resources in Saipan. All components of the ecosystem rely on each other, and destruction of one
- 2 part of the system will cause the entire system to respond or to become altered. Implementing
- 3 management measures to reduce human impacts on the lagoon system is crucial in preserving a
- 4 healthy and natural balanced ecosystem within the study area as well as areas that are outside of
- 5 the study area.

## 6 3.1.2 Preservation Issues

- 7 Increasing population and urbanization have led to rapid development of Garapan, the largest
- 8 village on Saipan, and the study area just south of Garapan. The urbanization of the inland
- 9 watershed area that has occurred over the past twenty years has dramatically increased the
- amount of sediments and stormwater runoff discharged into Saipan Lagoon. The probable future
- increase in urbanization of this area would likely increase the volume of sediment, nutrients, and
- 12 contaminants entering the lagoon via rainfall runoff. During rainfall events, large sediment,
- 13 nutrient, and contaminant loads entering the lagoon have a deleterious impact on the water
- quality and aquatic ecosystems within the lagoon. Photographs showing the conditions of the
- 15 lagoon and surrounding areas during rain events are included in Appendix E.
- Results of the MMT's lagoon monitoring study and published literature (Houk and Camacho,
- 17 2010; Houk and Van Woesik, 2008) indicate that the inner lagoon habitats are affected by
- 18 increased nutrient load entering the lagoon via stormwater runoff within the study area. The
- 19 lagoon area that is within the study area receives drainage from the West Takpochau watershed,
- an area of dense commercial and residential development. Paved roads, asphalt parking lots, and
- 21 areas devoid of vegetation enable stormwater runoff to flow unimpeded to the lagoon,
- 22 transporting and depositing sediments, nutrients, and pollutants from the watershed to the
- 23 lagoon. As a result of the influx of additional nutrients, these nearshore habitats have higher
- 24 abundances of seasonal macroalgae growth and Enhalus seagrass compared to outer lagoon
- 25 habitats (Houk and Van Woesik, 2008). Components of the lagoon ecosystem are interrelated,
- 26 with the health of each depending upon the health and function of the other components.
- 27 Changes to a single component, in this case, increase in macroalgae due to the addition of
- 28 nutrients, affects the entire aquatic ecosystem and can totally change and eventually destroy the
- 29 naturally existing marine community. In general, an influx of too many nutrients will stimulate
- 30 growth of certain organisms within the ecosystem in the short term, and eutrophication over an
- 31 extended period of time will lead to overall degradation of the aquatic ecosystem by decreasing
- 32 the population diversity.
- 33 A healthy saltwater lagoon community in the region of this study should ideally be characterized
- by a band of nearshore *Enhalus* seagrass, adjoined by a predominantly sandy bottom with few
- 35 and sparse stands of macroalgae and *Halodule* seagrass. In the case of Saipan Lagoon,
- 36 sediment-laden stormwater runoff (associated with nonpoint source pollution) drains into the
- ocean, providing excess nutrients to the coral reef system. As a result, organisms that can utilize
- 38 these additional nutrients are quickly becoming dominant. In tropical marine systems, turf and
- macroalgae can uptake nutrients at a faster rate than corals or coralline algae (Littler and Littler,
- 40 1988). The result of continuous sediment-laden, nutrient-rich stormwater runoff entering the
- 41 lagoon is an increase in macroalgae cover to the detriment of seagrass and coral habitat. As
- 42 nutrient levels entering the lagoon have increased, there has been a shift from barren sand

- 1 regions to larger and denser macroalgae stands. In certain areas of the lagoon, particularly at the
- 2 northern end of the study area near Garapan, the continuous discharge of high nutrient waters
- 3 during storm events and from other point source discharges, such as runoff discharge or sewer
- 4 failures, has led to a shift from the once seagrass dominated system to a macroalgae dominated
- 5 community. The natural progression resulting from a continuous supply of high nutrient waters
- 6 entering the lagoon is the initial development of Halodule seagrass stands in sandy regions,
- 7 eventually to be overgrown by macroalgae (DEQ, 2002b). This macro-algal community has a
- 8 short life cycle and continuously changes from one species to the next. Marine communities
- 9 characterized predominantly by macroalgae also provide little refuge for juvenile fish when
- 10 compared to a healthy seagrass-dominated system.
- 11 Macroalgae are able to overgrow slower-growing coral and seagrasses, and eventually replace
- 12 them by creating a shaded environment that is not tolerated by these taxa. An increase in
- macroalgae also affects juvenile coral larvae that would normally settle and grow on the reefs, by
- reducing available area for settlement, resulting in a decrease in corals. Nutrients also promote
- turf and filamentous algal growth, which further reduces available area for coral settlement.
- 16 Fewer corals settling on the reefs leads to less available habitat for marine life to exist within the
- aguatic ecosystem, since corals provide habitat and refuge for the numerous species of fish and
- invertebrates that compose a healthy marine ecosystem.
- 19 In addition to altering the aquatic ecosystem due to increases in nutrient levels, increased
- sediment entering the lagoon can create the following problems:
- increase the turbidity of the water and block the sunlight from reaching corals and their associated photosynthetic symbionts;
- physically smother corals;
- prevent the recruitment and settlement of coral larvae;
- fine clay particles can clog the gills of smaller organisms;
  - larger particles such as sand and silt can scour organisms off the bottom and off of submerged rocks and coral;
  - deposited sediments can bury and smother sessile or sedentary bottom life, nests, and deposited eggs; and
- sediment deposit deltas continually shift with the influx of sediment during storm events, preventing reestablishment of undisturbed aquatic habitats.
- 32 Macroalgae communities are currently dominant in the lagoon at the northern end of the study
- 33 area, adjacent to the heavily urbanized Garapan. Continuation of the influx of sediment-laden
- runoff water, expedited by increasing development within the study area south of Garapan, will
- 35 likely lead to a shift to a macroalgae-dominated marine system within the southern portion of the
- 36 lagoon as well.

27

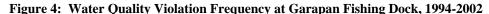
28

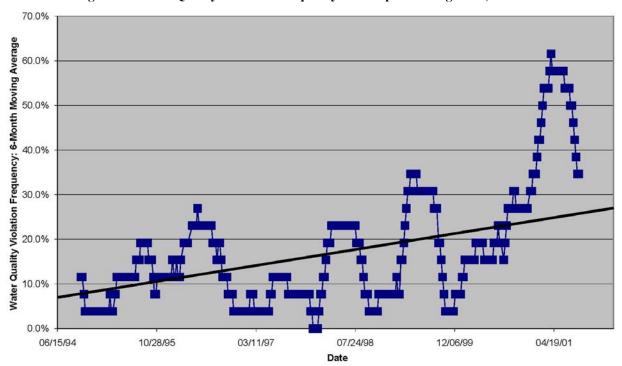
#### 3.1.3 Economic Issues

Deterioration of aquatic ecosystems and lagoon water quality is of concern not only for conservation issues, but also for economic reasons. The economy of Saipan is heavily reliant upon tourism with the sun, sandy beaches, spectacular reefs and marine life, and clean water being the primary attractions for tourists. Many hotels are located along the shoreline, with the beach and ocean providing the majority of tourist activities. Beach closures due to high levels of microbial contamination are becoming increasingly frequent along the west coast of Saipan (see Section 3.1.4). Additionally, the presence of nuisance macroalgae within the nearshore waters of Saipan has had deleterious impacts on the aesthetic value of the lagoon. Local fishermen who depend upon the reef for subsistence, as well as recreational and commercial fishing interests, are similarly concerned about the perceived degradation to the nearshore reef system. Further deterioration of the lagoon would be a great detriment to the tourist economy of Saipan and could cause irreparable harm to the economy of Saipan. The remainder of this section discusses specific factors that are contributing to the degradation of the lagoon ecosystem.

# 3.1.4 Water Quality

An interpretation of water quality data collected by DEQ from 1994 to 2002 indicates that there is a significant trend of increasing microbial (enterococci bacteria) contamination detections exceeding water quality standards. Figure 4 shows the increasing incidence of water quality violations at Garapan Fishing Dock located at the northern end of the study area.

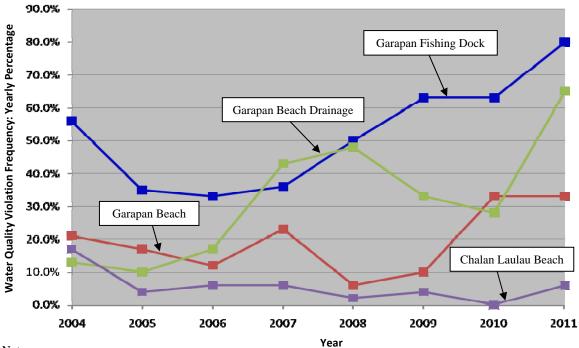




The increase in bacteriological contamination is a direct result of an increase in nonpoint source pollution associated with urbanization and population growth. Nonpoint source contamination occurs predominantly from surface runoff and sediments transported by runoff, solid and human waste disposal, and agricultural activities.

Water quality data from 38 fixed stations along Saipan's most commonly used west coast beaches collected during more recent years by the CNMI DEQ indicate that sampling sites within the West Takpochau (Central) Watershed continue to consistently experience a significant number of water quality violations, leading to multiple "impaired" (violation frequency exceeds 10%) or "significantly impaired" (violation frequency exceeds 25%) listings (DEQ, 2010). Beach advisories notifying the public that the beach waters within 300 feet of the sampling point are not safe for swimming are triggered when either the single sample maximum (SSM) or geometric mean (GM) for the most recent four sampling events exceeds the CNMI water quality criteria. Figure 5 shows the yearly percentage of water quality violations from 2004 to 2011 at four of the DEQ sampling stations that fall within the study area. Three stations (Garapan Fishing Dock, Garapan Beach, and Garapan Beach Drainage) occur at the northern end of the study area, whereas Chalan Laulau Beach occurs within the southern portion of the study area.





Notes:

1. Contaminant: Enterococci

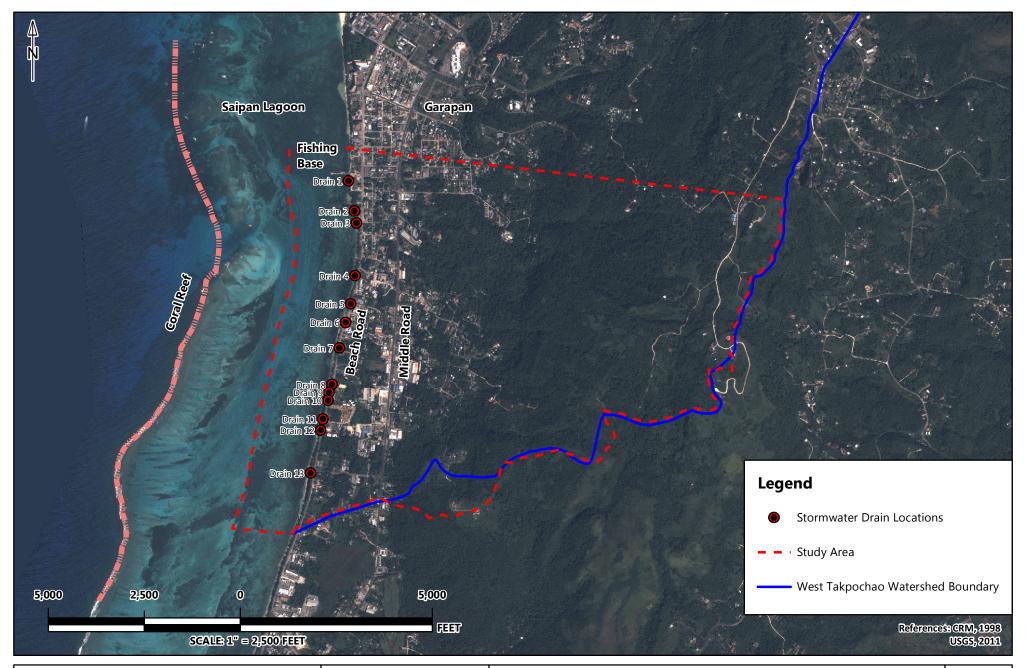
2. Violation frequencies are based on the number of samples (either the SSM or GM where sampling data exists for four previous sampling events) that exceeded the CNMI water quality criteria.

Water quality violation frequencies over the past eight years at the three stations located at the northern end of the study area show an overall increasing trend, which is likely due to the more

- densely populated and urbanized areas within the northern part of the study area. On the other
- 2 hand, water quality violations at Chalan Laulau Beach in the West Takpochao (South)
- 3 Watershed, which is less populated and urbanized, peaked in 2004 at 17%, and have
- 4 subsequently decreased to 0-6% in recent years. In fact, the CNMI has proposed to delist the
- 5 West Takpochao (South) segment from the impaired listing based on improvements in water
- 6 quality relative to enterococci contamination. However, the impaired listing of the West
- 7 Takpochao (South) segment (total maximum daily load (TMDL) required, medium priority) is
- 8 also related to low dissolved oxygen (DO) contents, bio-specific criteria, and the frequent
- 9 occurrence of orthophosphates from sanitary sewer overflows (SSOs), urban runoff, and
- 10 sedimentation.
- 11 The West Takpochau (Central) Watershed is also listed as impaired, TMDL required, and given
- 12 a high priority designation by the CNMI. This impaired listing is specific to dangers to aquatic
- 13 life, fish consumption, and recreation as a result of enterococci, mercury, DO, biocriteria, and
- orthophosphate contamination from sanitary SSOs, urban runoff, and sedimentation (DEQ,
- 15 2010). Water quality data collected within the study area, as well as the impaired listings of the
- watershed areas, indicate that anthropogenic degradation of the water quality within the lagoon
- remains an issue and continued close monitoring of the lagoon water quality is necessary.
- 18 Improved water quality will lead to a more sustainable environment for the marine species in the
- 19 lagoon as well as decreased seasonal macroalgae growth which is stimulated by the influx of
- 20 nutrient-rich water. Less macroalgae growth within the lagoon will in turn allow slower-growing
- 21 coral and seagrass to become more dominant in the area providing habitats for many species of
- fish and invertebrates.

#### 3.1.5 Flooding

- 24 At present, there are 13 storm drainage outlets within the study area that drain into Saipan
- Lagoon (Figure 6). The drains were originally installed during construction of Beach Road in
- 26 the early 1980s. Headwalls for the drain outlets were constructed when the beach walk (bike
- path) was built in the mid-1990's. These storm drains collect stormwater from the immediate
- vicinity of Beach Road (i.e. runoff from Beach Road and properties adjacent to the road. A
- 29 typical storm drain consists of a grated catch basin on the inland side of Beach Road, followed
- 30 by 30-inch diameter reinforced concrete pipes (RCPs) that run beneath Beach Road and convey
- 31 the stormwater from the catch basin to the lagoon. Drainage outlets consist of a single 30-inch
- 32 diameter RCP or multiple 30-inch RCPs.
- 33 Middle Road parallels Beach Road about a half-mile inland and is similarly drained by three
- 34 individual storm drains. The design of the drains is similar to that of Beach Road with catch
- basins on the inland side of the road and outlets on the seaward side of the road. The contributory
- 36 flow from the upland areas of Middle Road consists of overland flow and patchwork drainage
- 37 swales, but no unified drainage system. The drains along Middle Road discharge to the
- 38 properties between Beach Road and Middle Road. However, there is no connection between the
- 39 storm drains on the upper road and those on the lower road. There does not appear to be any
- 40 drainage easement through this area. Since the topography between Middle Road and Beach
- Road is relatively flat, runoff tends to pond in the area during moderate to heavy rainfall, before
- 42 making its way to the lagoon. Only a small fraction of the runoff from properties inland of





PROJECT NO.: 1057	ECOSYSTEM RESTORATION REPORT	
DATE: SEPTEMBER 20, 2012	SAIPAN LAGOON AQUATIC ECOSYSTEM RESTORATION STUDY	FIGURE
DRAWN BY: CB	STORM DRAIN OUTLETS WITHIN THE STUDY AREA	6
REVIEWED BY: MA	SAIPAN, CNMI	

1 Middle Road reach the storm drains at Beach Road during small intensity rainstorms, with the 2 majority of the runoff infiltrating into the highly permeable limestone. Depending on the 3 severity of the rainfall event, heavy flooding of the down-slope properties and roads occurs. During moderate to heavy rainfall events, both Middle and Beach Roads become severely 4 5 flooded. Without a system to properly divert and capture stormwater runoff, and release in a 6 more controlled manner, untreated land-based contaminant, nutrient, and sediment laden runoff 7 water is more likely to overflow and enter nearshore waters within the study area during large 8 rain events. With a proper system to capture stormwater runoff, the amount of contaminant, 9 nutrient, and sediment entering the lagoon will be more controlled, leading to a better 10 environment for proper ecosystem function.

#### 3.1.6 Runoff and Sedimentation

11

12 Increased sediment, nutrient, and contaminant loads entering the lagoon can be generally 13 attributed to several factors, including: the lack of comprehensive land management planning 14 and zoning practices, the absence of an adequate stormwater collection and conveyance system, 15 and the removal of vegetation that serves to detain and filter sediments naturally. Prior to urban development of the study area, the majority of sediment and stormwater runoff was trapped by 16 17 the natural vegetation present along the coastal plain before reaching the lagoon. Many of the 18 roads and building lots between Beach and Middle Roads and upslope of Middle Road are 19 unpaved, exposing loose sediment to surface water runoff during rain events. Because of the 20 lack of an adequate stormwater collection, conveyance, and treatment system, sediment is 21 directly transported from these exposed areas to the lagoon. During heavy rain events, surface 22 runoff water flows unimpeded down roads and through parking lots to the lagoon.

23 Sediment transported from the watershed to the lagoon contains high levels of nutrients as well 24 as contaminants. Sediment-laden runoff waters transport surficial contaminants from upslope 25 surfaces and deposits them into the lagoon. Contaminants vary depending upon activities that take place within the watershed (e.g., construction, agricultural, or mechanical). The resulting 26 27 increased levels of runoff and sedimentation to the lagoon overload the ability of the natural 28 seagrass and coral communities to cope with these pollutants and can damage these delicate 29 ecosystems. Damage to coral reef ecosystems can result from direct sedimentation onto coral 30 polyps or from increased nutrient concentrations that may lead to overgrowth by algal species. In addition, pollutants that are carried by the stormwater can cause damage to the reefs by 31 32 blocking coral fertilization during spawning events, some of which occur only twice per year. 33 Finally, a large influx of freshwater runoff into the shallow lagoon changes the salinity of the 34 water, potentially outside the narrow range required to sustain healthy corals.

A shift in reef species towards more nutrient tolerant and less diverse communities as a result of increased levels of runoff and sedimentation will also lead to changes in the fish populations inhabiting the reef. In addition, less diverse communities of coral are more susceptible to damage during natural disasters such as typhoons. In order to prevent further irreversible damage to the nearshore ecosystem in Saipan Lagoon, it is critical to implement management measures to control or reduce the amount of sediment, nutrient, and contaminant loads entering the lagoon.

# 3.1.7 Contamination of the Lagoon

1

16

17

18

19

20

21

22

23

24

25

26

27

28

35

- 2 At present, the homes and businesses within the study area are not connected to a municipal
- 3 sewer system and use septic systems for disposal of wastewater. No records were available
- 4 describing the number and location of septic systems in the area. Local regulatory officials
- 5 suggested that some gray water disposal is discharged directly to the surface without benefit of a
- 6 septic system or leach field. It is believed that septic system failures probably contribute a
- 7 significant amount of nutrients to the nearshore waters within the study area. The CWA Section
- 8 319 Nonpoint Source Grant Program administered by the DEO Nonpoint Source Pollution
- 9 Control Program is currently funding an on-going inventory and inspection of septic systems
- throughout Saipan (DEQ, 2010).
- 11 SSOs have been reported for the existing wastewater collection system. However, there are no
- 12 records that detail the frequency, location, quantity, cause, or affected area. The only
- information available is a trouble call log. There have been reports that some overflows have
- 14 caused wastewater to be discharged into the nearshore marine environment. According to local
- personnel familiar with the system, the major causes for SSOs have been reported to be:
  - Failure of lift station pumps due to clogging of the impellers.
    - Capacity of the collection system exceeded during storm events. During storm events, collection systems occasionally receive excessive flow and infiltration causing them to backup and overflow.
    - Large portions of the existing collection systems in the Chalan Kanoa/Kobler area and in the Garapan area were constructed in the early 1970s. The original sewers were constructed using vitrified clay pipe. The age of the sewer coupled with the pipe material may be conducive to leaks.
    - The sewers are located in areas that have a shallow groundwater table, further increasing the possibility of contamination.
      - Localized flooding during storm events may lead to inflow at discrete points within the collection system (e.g., manholes or lift station wet wells), and subsequent overloading of the collection systems.
- 29 As discussed in earlier sections, nutrient enrichment leads to overgrowth of macroalgal species
- 30 that can uptake nutrients faster than corals, coralline algae, or seagrass communities, eventually
- 31 outgrowing these species. Fewer seagrass and coral communities mean that there will be less
- 32 available habitat and refuge for many species of fish and invertebrates to exist. In order to
- restore and sustain a healthy lagoon environment, measures must be taken to control the amount
- of nutrients entering Saipan Lagoon.

# 3.2 PROBLEM AND OPPORTUNITY STATEMENTS

- 36 Sedimentation and increased nutrient load is recognized as one of the most significant problems
- facing Saipan Lagoon and is a direct result of urban development that has taken place within the
- 38 West Takpochau watershed. The following items provide a summary of the main problems
- 39 identified within the study area:

- Continued input of nutrient-rich stormwater runoff into the lagoon has led to a shift from the once seagrass dominated system to a macroalgae dominated community within the inner lagoon habitats, which can be detrimental for the development of slower-growing coral and seagrass.
- Increased sediment load entering the lagoon via stormwater runoff can hinder the development and growth of corals and other organisms by increasing the water turbidity or by physically smothering them and their habitats.
- Increased frequencies of microbial contamination detections exceeding water quality standards as a direct result of increase in nonpoint source pollution associated with urbanization and population growth has contributed to a shift to a macroalgae dominated system in the nearshore waters.
- Increasingly frequent beach closures due to high levels of microbial contamination and the presence of nuisance macroalgae within the nearshore waters have had deleterious impacts on the recreational use as well as the aesthetic and economic value of the lagoon.
- Decline in abundance of nearshore fish species is not only a concern from an ecological standpoint but also a concern for economical reasons for local fishermen who depend on the resources for subsistence.

#### 3.3 FORECASTED WITHOUT-PROJECT CONDITIONS

- Future outcomes without implementation of preventive measures to address the problems identified in the study area are as follows:
  - Continuous supply of nutrient-rich waters to the lagoon will continue to enhance the growth of macroalgae within the nearshore area, especially in the northern end of the study area adjacent to the heavily urbanized Garapan where macroalgae communities are currently dominant.
  - The macroalgae community that is currently dominant in the northern end of the study area will eventually replace the slower growing coral and sea grasses, which will lead to less or no available habitat for marine life to exist within that area of the lagoon.
  - Alteration of one area of the lagoon, in this case the northern part of the study area, is likely to negatively impact and cause imbalance within the ecosystem of the remaining portions of the lagoon.
  - Continuous supply of nutrient-rich waters to the lagoon will likely lead to a shift to a
    macroalgae-dominated marine system within the southern portion of the study area as
    well.
    - Continued input of sediment into the lagoon via stormwater runoff will hinder the development and growth of corals and other organisms by increasing the water turbidity or by physically smothering them and their habitats, which will lead to a decrease in the diversity of marine species within the lagoon ecosystem.

- Continued enhancement of macroalgae growth within the study area will lead to eventual depletion of valuable aquatic resources including the coral reef and the organisms that it supports.
  - Microbial contamination associated with nonpoint source pollution will further enhance the growth of macroalgae as well as result in increased frequencies of beach closures within the study area.
  - Increasingly frequent beach closures due to high levels of microbial contamination and the presence of nuisance macroalgae within the nearshore waters will have negative impacts on the tourism industry in Saipan as many hotels are located along the shoreline within the study area.
  - The decline in abundance of nearshore fish species as a result of ecosystem degradation within the study area will have a negative impact on the local economy as many local fishermen depend on the resources within the study area for subsistence and because marine life is one of the major tourist attractions in Saipan.

#### 15 3.4 STUDY OBJECTIVES

- 16 The objective of this study is to recommend an environmentally sensitive and economically
- 17 feasible restoration alternative that would best restore the degraded aquatic ecosystem structure,
- 18 function, and dynamic processes to a less degraded and more natural condition. The objectives
- 19 of the restoration alternative are to:
  - Reduce the abundance and frequency of occurrence of fast growth nuisance macroalage within the study area.
- 22 • Decrease the amount of sediment and nutrients that enter the lagoon.
- 23 • Decrease the concentration of microbial contamination in nearshore waters of the lagoon.
- 24 A detailed description of the quantitative goals of these objectives is further discussed in Section
- 25 5 of this report. Achievement of these objective would improve the lagoon ecosystem in the
- 26 following ways:

1

2

3

4

5

6

7

8

9

10

11

12 13

14

20

21

- 27 • reduce the amount of nutrients entering the lagoon, thus enabling natural seagrasses, 28 corals, and aquatic life to regenerate in areas currently dominated by macroalgae, 29 characteristic of a high nutrient environment;
- 30 reclaim nearshore areas of the lagoon ecosystem that are currently inundated with sediment:
- 32 • regain diversity within the aquatic ecosystem; and
- 33 improve lagoon water quality to a state conducive to coral reef ecosystem restoration.
- 34 Reduction of the sediment and nutrient load transported to the lagoon would significantly
- 35 improve the overall function of the aquatic ecosystem. Restoration of the lagoon ecosystem
- would also benefit the local tourist economy, the fishery, and the overall development of Saipan. 36

3

4

5

6 7

8

9

- 1 Constraints that may restrict achievement of the study objectives include the following:
  - Factors that are not directly linked with stormwater runoff that the restoration alternative intends to address, such as groundwater or other drainages outside of the study area, may have influence on the outcome of the project.
    - Limited knowledge on the specific sources of nutrient and sediment loads that enter the lagoon as well as runoff processes within the watershed may restrict the ability of the restoration alternative to address these issues in the study area.
    - Natural disasters such as large hurricanes or tsunamis during implementation of the management measure may pose limitation to assess the outcome of the project.
- Alternative plans will need to take these constraints into consideration in order to reach the planned study objectives and to achieve the desired outcomes.

#### 4. BASELINE MONITORING RESULTS

2 Review of previous biological and environmental studies conducted on Saipan during the Phase I

3 portion of this study identified a number of additional studies required to adequately establish

4 baseline environmental conditions within Saipan Lagoon. The results of these baseline studies

5 will be used to aid in the development of remedial measures within the study area and will

6 facilitate evaluation of the effectiveness of these measures in the future. In addition, data derived

from field studies was used to assist in identification of deleterious impacts of contaminant

8 sources entering the lagoon. The data generated by these studies will be combined with the

existing site data and utilized to refine the design of future remedial measures. The CNMI DEQ

and CRMO personnel were instrumental in many of these studies, assisting with research,

11 laboratory analyses, and field activities.

1

7

9

12

25

26

31

39

## 4.1 STORMWATER QUALITY INVESTIGATION

13 Stormwater runoff samples were collected between February and December 2002 from four

storm drains located along the shoreline within the study area, one storm drain located south of

15 the study area, and two storm drains located north of the study area, and analyzed for priority

pollutant metals. The stormwater runoff sample results were compared against the EPA national

17 recommended water quality standards for priority pollutants (EPA, 2009), chronic and acute

toxicity values for the freshwater aquatic life criteria. Cadmium, copper, lead, nickel, selenium,

and zinc were detected at a concentration exceeding the acute or chronic toxicity standards in at

20 least one of the samples collected.

21 Some metal species were detected at elevated concentrations during times of high stormwater

discharge, which provides some evidence for anthropogenic sources of these metal species

23 washing into the lagoon via stormwater runoff during large rainfall events. However, runoff

sample exceedances occurred during both the dry and wet season, and the results were not

consistent enough to conclude that more metals are carried into the lagoon during larger rainfall

events. Rather, the results of this 2002 study likely suggest that the amount of metals that are

27 carried into the lagoon via stormwater runoff are more dependent on the source of contamination

28 (e.g., from pervious vs. impervious surfaces) and the relative timing of the rain event.

29 Stormwater runoff during early season rains or after a prolonged dry period usually contain the

30 highest pollutant content due to the amount of time that has allowed pollutants to be deposited

and accumulate on impervious surfaces. Pollutants from pervious surfaces on the other hand

32 may be found at a constant rate regardless of the timing of the rain event. Additional

33 investigation and more frequent stormwater quality monitoring would be required to determine

34 the sources of metal pollutants and assess their timing of release into the lagoon relative to

35 precipitation and runoff totals. Since the current study proposes a solution that will capture and

36 retain contaminated stormwater regardless of the source of metal pollutants, additional study is

37 considered outside the scope of this study. A detailed description of the 2002 investigation

results as well as the laboratory analytical reports are included in Appendix C.1.

#### 4.2 LAGOON SEDIMENT PHYSICAL AND CHEMICAL PARAMETERS

40 As part of an effort to characterize the general distribution and abundance of pollutants in

41 sediments in the study area, a total of 18 surface sediment samples were collected from the

- lagoon bottom in September 2002. Samples were collected from six transects extending from
- 2 nearshore to the outer lagoon, stretching the entire length of the study area. The starting point
- 3 for each transect was established at five storm drains located along the shoreline of the study area
- 4 as well as a wetland location at the southern end of the study area.
- 5 Each transect included a sample location within the nearshore *Enhalus* beds, within the nearshore
- 6 Halodule band, and within offshore Enhalus beds located beyond the channel. These sampling
- 7 locations were estimated to be at 250 m, 500 m, and 1,000 m from shore. Each sediment sample
- 8 was analyzed for priority pollutant metals, polychlorinated biphenyls (PCBs), and polycyclic
- 9 aromatic hydrocarbons (PAHs), as well as specific PCB congeners known to be found north of
- the study area in the Tanapag area during the Water and Environmental Research Institute of the
- 11 Western Pacific (WERI) study.
- 12 As a non-regulatory comparison, analytical results of sediment samples were compared to the
- 13 EPA regional screening levels (RSLs) for residential soil (EPA, 2012). Overall metals
- 14 concentrations detected in lagoon sediment were low, but analytical results indicate that in
- 15 general, sediment collected from the nearshore contained slightly higher concentrations of metals
- 16 than those samples collected from mid- to off-shore locations. Concentrations of arsenic
- 17 exceeded the EPA RSL for residential soil in some or all of the locations for all six transects.
- 18 Concentrations of arsenic detected in samples ranged from 5.1 to 12 milligrams per kilogram
- 19 (mg/kg), compared to the residential RSL of 0.39 mg/kg.
- 20 PCBs, PAHs, and PCB congeners were not detected in any of the samples above the laboratory
- 21 reporting limits. All laboratory reporting limits were below the EPA RSLs except for
- benzo(a)anthracene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene.
- 23 More recent data characterizing the sediment composition of Saipan Lagoon are available from a
- 24 study conducted by Denton and Starmer (2009) in which sediment samples for heavy metals
- analysis were collected from 16 of 22 coastal stormwater discharge points that currently exist
- along the southern half of the lagoon. Surface sediments were collected at offshore locations at 0
- 27 m, 10 m, 25 m, 50 m, 100 m, and 250 m from shore along transect lines perpendicular to the
- discharge points. Samples were also collected from 500 m and 1,000 m offshore where possible.
- 29 Geometric means were calculated at each distance and the minimum and maximum
- 30 concentrations were determined.
- 31 Metals concentrations found in surface sediment samples collected in 2009 were all below the
- 32 EPA RSL, and were similar to those found in sediment samples collected in 2002. The 2009
- data collection found the highest levels of metals in sediment samples close to shore, as opposed
- 34 to those collected further offshore. This is in agreement with findings from the 2002 data
- 35 collection and appears to support the theory that urban runoff is one of the major contributing
- 36 sources for metal contamination in the lagoon sediment. A detailed discussion of the sediment
- sample results as well as the laboratory analytical reports are included in Appendix C.2.

20

21

# 4.3 HISTORICAL ASSESSMENT OF THE LAGOON FROM AERIAL PHOTOGRAPHS

- 3 A historical assessment of the lagoon environment was completed simultaneously with the
- 4 historical assessment of the land area. A detailed description and visual analysis of the aerial
- 5 photographs are included in Section 2.4. DEQ marine biology staff members were instrumental
- 6 in the interpretation of changes in the lagoon environment apparent in the aerial photographs.
- 7 Historic aerial photograph comparisons indicate that the nearshore lagoon ecosystem has shifted
- 8 from a healthy seagrass and sandy-bottom community to a less healthy, macroalgae dominated
- 9 community in response to heavy urbanization and development within the watershed both
- 10 currently and in the past. A detailed assessment of the lagoon environmental change observed
- from aerial photographs of the study area is included in Appendix C.3.

## 12 4.4 INSHORE LAGOON SEAGRASS AND ASSOCIATED FAUNA SURVEY

- 13 The MMT Saipan Lagoon monitoring effort has completed an inventory of the lagoon, including
- 14 the study area. Results of the initial assessment efforts in the study area indicate that the inner
- 15 lagoon habitats are affected by increased nutrients associated with stormwater from the West
- 16 Takpochau watershed reaching the drainages and shores in this region, and entering the lagoon.
- 17 These habitats have high abundances of seasonal macroalgae growth when compared to outer
- 18 lagoon habitats. The MMT has designated 18 habitat classifications within the lagoon. Detailed
- descriptions of the habitats that exist within the study area are included in Appendix C.4.

# 4.5 INVENTORY OF POTENTIALLY CONTAMINATING ACTIVITIES IN WATERSHED

- 22 An integral part of this aquatic ecosystem restoration study was to identify land-based sources of
- pollution that could potentially contribute nutrients, sediments, or contaminants to the lagoon.
- 24 PCAs within the study area were inventoried and subjected to a susceptibility analysis. Fifty
- four (54) sites were identified during the PCA inventory. The number and category of PCAs
- 26 found within the study area were used to quantify the environmental output that would result
- from implementing the restoration alternatives. A detailed discussion and inventory of the PCAs
- within the study area are included in Appendix C.5.

#### 29 4.6 GROUNDWATER INVESTIGATION

- 30 Nearshore groundwater samples were collected along the entire length of the study area and
- 31 beyond in March, June, and August, 2002, in an effort to determine the impact of on-shore
- 32 surface contaminants on the lagoon via groundwater infiltration. The 2002 analytical results
- indicate that there are elevated nitrate levels in nearshore groundwater infiltrating to the lagoon.
- 34 Nitrate levels of nearshore coastal marine waters may be affected by activities within the
- 35 watershed.
- 36 Although semi-annual groundwater monitoring, including monitoring for nitrate indicators, has
- 37 been required by the DEQ for many years, more recent groundwater data collected within the
- 38 study area are not available due to the lack of a comprehensive groundwater management plan
- 39 that includes methods for analyzing the collected samples and actions to be taken based on the

- data collected (DEQ, 2010). The nearshore groundwater nitrate results from 2002 are included
- 2 in Appendix C.6.

#### 3 4.7 HYDROLOGIC STUDY OF RUNOFF PROCESSES IN THE WATERSHED

## 4 4.7.1 Rainfall and Runoff Data Collection

- 5 In order to help determine general comprehensive hydrologic processes within the study area,
- 6 rainfall and runoff data were collected in 2002 from rain gauges, transducers, and by manual
- 7 measurements within the study area. Stormwater peak flow rates at nearshore locations were
- 8 found to range from 12 gallons per minute (gpm) to 1,000 gpm at individual discharge locations.
- 9 Although no additional rainfall data has been collected at the study area since 2002, the 2002
- data indicates that large volumes of runoff from the steep upper/inland portion of the watershed
- 11 flows down onto Beach Road and enters the lagoon via surface sheet flow during large rain
- events. Rainfall and runoff data collected in 2002 as well as a detailed discussion of the results
- are included in Appendix C.7.

## 14 4.7.2 Sediment Delta Surveys

- 15 In an effort to quantify the sediment load entering the lagoon via stormwater runoff, three
- sediment deltas within the study area were surveyed five times from 2001 to 2002, during both
- 17 the wet and dry seasons. The approximate volumes of the sediment deltas were measured and
- 18 compared against the corresponding monthly rainfall data during each monitoring event. The
- 19 change in sediment delta volume throughout the study interval varied among the survey
- 20 locations. The total volume of sediment lost from the three deltas during the study interval was
- 478 cubic yards. The volume of sediment lost was most likely washed into the lagoon during the
- 22 two-month period. The results of the sediment delta surveys are included in Appendix C.7.

#### 23 4.8 LAGOON WATER QUALITY INVESTIGATION

- 24 In order to obtain general lagoon water quality data, lagoon water samples were collected by
- DEQ personnel from February 2002 to February 2003. Samples were collected in nearshore
- 26 waters adjacent to three storm drains located within the study area and one storm drain located
- 27 immediately south of the study area. Samples were analyzed for microbiological and chemical
- 28 parameters by the DEQ Environmental Surveillance Laboratory. The analytical results were
- compared against the CNMI water quality criteria for Class AA marine waters (DEQ, 2010).
- 30 During the 2002-2003 sampling period, water quality standard exceedances were regularly
- 31 observed for instantaneous enterococci measurements, DO, turbidity, hydrogen activity (pH),
- 32 nitrate, and orthophosphate, although strong correlations among the measured parameters were
- 33 not noted. Average values of the water quality sample results for the 2002-2003 sampling period
- during the wet season (July through November) and dry season (December through June) were
- calculated for all parameters except fecal coliform. Enterococci values were consistently higher
- at all four sample locations during the wet season than during the dry season, as was turbidity at
- three sample locations. Salinity was consistently higher during dry season sampling events at all
- four sample locations, as were DO and chloride. These patterns fit the general presumption that
- 39 nearshore lagoon waters are affected by an increased volume of stormwater runoff during the
- 40 rainy season, leading to an increase in turbidity and microbial contamination. During the dry

- season, less freshwater runoff is experienced, leading to higher salinities and chlorides, and
- 2 lower turbidity and less microbial contamination.
- 3 The DEQ currently monitors 38 fixed stations along Saipan's most used west coast beaches on a
- 4 weekly basis for microbiological and chemical parameters. Four of these fixed stations occur
- 5 within the study area. During a more recent monitoring period (July 2010 to June 2011), water
- 6 quality standard exceedances were regularly observed for instantaneous and GM enterococci
- 7 measurements, DO, turbidity, and pH, although strong correlations were not noted.
- 8 As a comparison, average values of the 2010-2011 monitoring data for the wet season and dry
- 9 season were also calculated. No significant correlation between the season and the water quality
- parameters were observed for the 2010-2011 monitoring data, which is not entirely surprising
- given the short period of time analyzed. This may indicate that other factors play a role in the
- 12 transport of contaminants to the lagoon. There may be periodic releases of pollutants not
- associated with rainfall, a better system of contaminant uptake, a natural filtration or buffering of
- stormwater runoff prior to discharging into the lagoon, or a difference in upgradient land use.
- 15 The lagoon water sample results are included in Appendix C.8.

This page is intentionally left blank.

#### 5. RESTORATION ALTERNATIVE EVALUATION

- 2 In order to achieve the overall project goal of restoring the lagoon aquatic ecosystem structure,
- 3 function, and dynamic processes to a less degraded and more natural condition, restoration
- 4 alternatives were formulated with the goal of restoring the ecosystem to be self-sustaining in its
- 5 substantially modified environment. This section discusses ecosystem restoration policy, the
- 6 restoration alternative formulation process, the evaluation of restoration alternatives using cost
- 7 effectiveness (CE)/incremental cost analysis (ICA), as required by the Economic and
- 8 Environmental Principles and Guidelines for Water and Related Land Resources Implementation
- 9 Studies developed by the Water Resources Council (WRC) (WRC, 1983), and the selection of
- 10 the best restoration alternative. The CE/ICA was conducted using the USACE Institute of Water
- 11 Resources (IWR) Planning Suite Decision Support Software. A detailed description of the
- processes used as part of the CE/ICA for the evaluation of the restoration alternatives is included
- in Section 5.9.

1

#### 14 5.1 ECOSYSTEM RESTORATION POLICY OVERVIEW

- 15 Applicable policy governing USACE restoration projects include the Planning Guidance
- Notebook (ER 1105-2-100) and the Ecosystem Restoration Guidance (ER 1165-2-502 in support
- of ER 1165-2-501). Ecosystem restoration reestablishes a self-maintaining state that optimally
- should require very little human intervention.
- 19 Additionally, the entire ecosystem is the target of transformation by restoration, as opposed to a
- 20 specific species or a single component of habitat. Ecosystem restoration includes the entire
- 21 biotic community together with its physical environment, considered as an integrated unit (EP
- 22 1165-2-502). Often, only partial ecosystem restoration is practical, but the parts restored are
- done so holistically.
- 24 According to USACE policy requirements, restoration projects should conform to the following
- 25 constraints:
- the project should restore ecosystem structure, functions and values;
- the project should result in improved environmental quality;
- the sum of all monetary and non-monetary benefits should exceed the sum of all monetary and non-monetary costs;
- the measures taken to improve environmental quality should result in a more naturalistic and self-regulating system; and
- the measures should reestablish, to the extent possible, a close approximation of pre-existing conditions.
- Constraints specific to this study are included in Section 3.4.

#### 1 5.2 RESTORATION PLAN FORMULATION PROCESS

- 2 Restoration plan formulation strategies are based on guidelines set forth by the USACE
- 3 Ecosystem Restoration Planning and Evaluation Program. There are two primary principles
- 4 applied when determining plans:
- 5 1. Plans must meet each of the planning objectives without violating any constraints such as regulatory, economic, or social constraints.
  - 2. Plans must be based on institutional, technical, and public variables that are important to the entities involved (i.e., local cooperators, community, and USACE).
- 9 In order to fulfill the above principles, USACE guidelines offer the following criteria that a restoration plan must meet:
- must address the objectives of the project;
- must define the management measures that are required for the alternative;
- must be able to estimate the total cost of the alternative; and
- must be able to estimate a positive, quantifiable output.
- 15 In an effort to find the best possible solution for areas in need of restoration, alternative
- 16 restoration plans have been developed as part of the formulation process. Exploring and
- developing alternative plans is beneficial because it leads to the best possible solution by
- 18 encouraging creative thinking, allowing a broad view of the natural resources and planning
- 19 perspective, and promoting a greater understanding of natural processes, risks, and concerns
- associated with the project.

#### 21 5.3 FORMULATION OF ALTERNATIVE PLANS

- 22 The following management measures were considered during the initial alternative formulation
- 23 process:

7

- no action;
- capturing and pumping contaminants offshore;
- erosion control; and
- detention basins.
- 28 The no action alternative was considered to be unresponsive to the needs of the local sponsor and
- 29 was eliminated from further evaluation. The no action alternative was, however, included in the
- 30 alternatives analysis in the EA (Appendix A) as well as in the CE/ICA as required by the Council
- of Environmental Quality (CEQ) regulation 40 Code of Federal Regulations (CFR) Section
- 32 1502.14(d).
- Capturing and pumping contaminants offshore was eliminated from further evaluation because
- 34 CNMI stated that they cannot afford to maintain the mechanical pumps. In addition, this

- 1 management measure would not fulfill the objective of this study since it would not reduce the
- 2 amount of nutrients/sediment entering the lagoon but would rather relocate them offshore. This
- 3 would not result in an overall restoration of the lagoon ecosystem, which is the ultimate goal of
- 4 this study; therefore was not carried forward for further evaluation.
- 5 Erosion control within the upper portion of the watershed was not carried forward for further
- 6 consideration because it was not considered feasible to manage or control the widespread areas
- 7 within the watershed that contribute to the input of sediment/nutrients to the lagoon via
- 8 stormwater runoff. Many roads remain unpaved within the watershed, and clearing of natural
- 9 vegetation that makes the native soil susceptible to erosion is expected to increase with the
- 10 increased urbanization that is expected to occur within the study area. It was considered
- inefficient and impractical to consider implementing erosion control in all of these areas.
- 12 Although not carried forward for consideration as one of the management measures, erosion
- 13 control including paving or armoring unpaved roads, land use controls, public education,
- reforestation, and enforcing existing CNMI regulations for new construction projects to reduce
- or control the amount of sediment and runoff generated within the study area are recommended
- as one of the local BMPs to be implemented by the CNMI Government in conjunction with the
- management measure recommended in this study (see Section 5.11.5).
- 18 Construction of detention basins was considered the most cost effective and efficient
- 19 management measure in addressing the objectives of the study by efficiently collecting the
- 20 majority of sediment, nutrient, and contaminant laden runoff that would otherwise become
- 21 directly washed into the lagoon. The detention basins would capture and temporarily retain
- stormwater runoff from the upper watershed and allow suspended sediment and nutrients to
- settle out before stormwater is released to the lagoon, thereby reducing the amount of sediment
- 24 and nutrients that is transported to the lagoon. Sources of excess sediment, nutrient, and
- 25 contaminants that reach the lagoon are spread out throughout the study area, and construction of
- detention basins would be most efficient in collecting the runoff from the upper watershed prior
- 27 to it reaching the lagoon; therefore, was carried forward for further evaluation. As discussed
- 28 further in the following section, three detention basin sites within the study area were selected.
- 29 each with three storage capacities. A combination of two or more of these detention basins sites
- 30 were considered in formulating and evaluating a restoration alternative that would best achieve
- 31 the study objectives.

## 5.4 DESCRIPTION OF FORMULATION ALTERNATIVES

- 33 Three detention basin sites were considered to achieve the overall project goal of restoring the
- 34 Saipan Lagoon aquatic ecosystem structure, function, and dynamic processes to a less degraded
- and more natural condition. Dual-purpose type uses, such as soccer fields or parks, for the
- detention basins were originally considered but the project sponsor evaluated the level of effort
- that would be required for maintenance and upkeep and determined that it was impractical and
- 38 could not be supported. Three sizes of dry detention basins were designed for each of the three
- 39 sites, corresponding to the expected influx of water during a two-year rainfall event, a five-year
- 40 rainfall event, and a 10-year rainfall event. There are thus a total of nine possible detention
- 41 basins over three different sites. A detailed description and design for each detention basin are
- 42 included in the Preliminary Drainage Design Report prepared for the project (Appendix F).

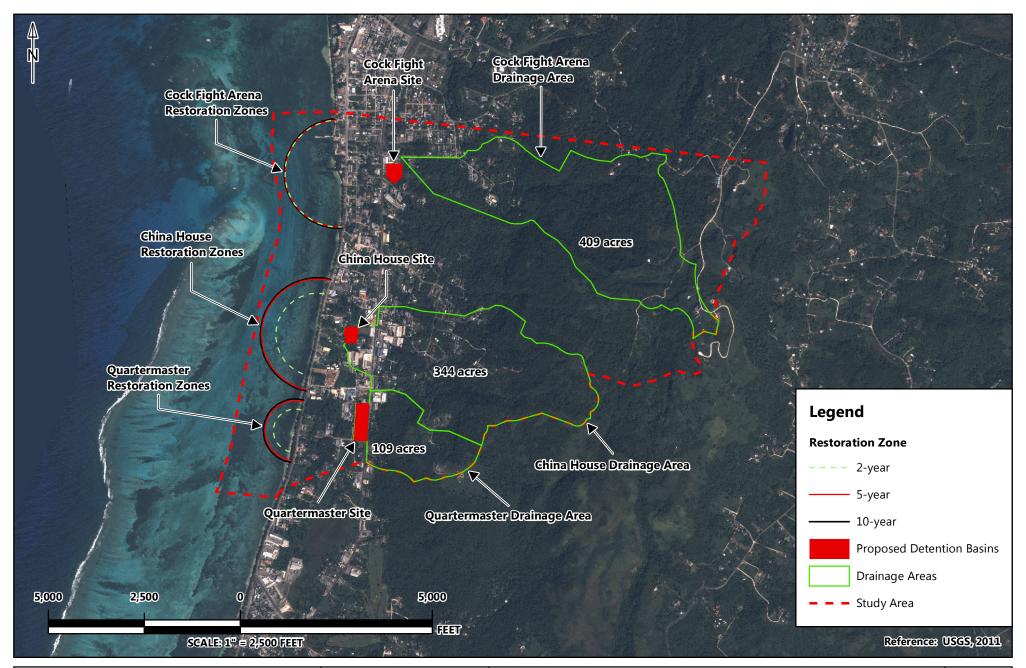
- 1 The three sites evaluated through the CE/ICA are located within the southern portion of the West
- 2 Takpochao watershed (Figure 7). The three sites were selected based on available vacant land
- 3 within the vicinity of Beach Road and Middle Road, and had to meet the requirement of being
- 4 low-lying areas that flood during heavy rains. Placement of a detention basin at a location where
- 5 stormwater runoff naturally accumulates was considered most appropriate in capturing runoff
- 6 that flows down the steep upper/inland part of the watershed. The three sites were evaluated in
- 7 terms of the amount of freshwater they could hold (capacity), the percent of the watershed that
- 8 would drain into the detention basin, and the relative amount of sediment, hazardous runoff, and
- 9 runoff loading they would receive compared to the amount generated within the entire study
- 10 area.

#### 11 **5.4.1** China House Site

- 12 The proposed China House site is approximately 2.8 acres in area and is located in the
- mid-southern portion of the study area, about halfway between Middle and Beach Roads. The
- 14 China House site occurs between Middle Road, across from the Pizza Hut building, and Beach
- Road near the China House restaurant. Topographically, the site is characterized by a natural
- drainage channel that flows to an outfall located along Beach Road in the center of the proposed
- site. The remaining site area is predominantly flat to slightly sloping (approximately 3.5%)
- 18 toward Beach Road and the lagoon.
- 19 The site currently serves as a natural drainage area for surface water from Middle Road and the
- 20 upper parts of the Gualo Rai area. Surface water reaches the lagoon through this area via surface
- 21 sheet flow and through the natural swale. There is currently a stormwater catch basin, located
- 22 along Middle Road adjacent to Pizza Hut, which collects surface water and diverts it beneath
- 23 Middle Road, and into the proposed detention basin site. During medium to large storm events,
- 24 the catch basin is insufficient to handle the volume of runoff and severe flooding occurs along
- 25 Middle Road at the Pizza Hut location. The topographic nature of this site is conducive to the
- 26 construction of a detention basin. The entire parcel of the site is currently publicly owned.

## 27 **5.4.2 Quartermaster Site**

- 28 The proposed Quartermaster site is approximately 6.6 acres and located at the southern-most end
- 29 of the study area. The site is located at the intersection of Quartermaster Road to the south and
- 30 Middle Road to the east. The site is currently vacant and overgrown, and generally slopes to the
- 31 southwest corner at approximately 4 to 5%. Several commercial and residential buildings lie
- 32 adjacent to the proposed site.
- Quartermaster Road, together with adjacent swales, serves as a major drainage route for surface
- 34 water during rain events. A drainage culvert is located beneath Middle Road at the intersection
- of Middle and Quartermaster Roads. The contributory area to surface runoff in this area includes
- 36 Middle Road and areas in the southern portion of the West Takpochao watershed. A detention
- 37 basin that would act as a settling pond for sediment and contaminants prior to discharging
- 38 surface water to the lagoon would be constructed at this site. The land required for the site is
- 39 currently privately owned.



- Environet,	Inc.

	PROJECT NO.: 1057	ECOSYSTEM RESTORATION REPORT	
	DATE: SEPTEMBER 20, 2012	SAIPAN LAGOON AQUATIC ECOSYSTEM RESTORATION STUDY	FIGURE
•	DRAWN BY: CB	PROPOSED DETENTION BASINS AND DRAINAGE AREAS	7
	REVIEWED BY: MA	SAIPAN, CNMI	

## 5.4.3 Cock Fight Arena Site

1

2 The proposed Cock Fight Arena site is approximately 4.2 acres in area and is located on the east side of Middle Road at the northern end of the study area. 3 The closest cross street is 4 Commonwealth Road, located approximately 200 feet north of the Cock Fight Arena site. This 5 site is characterized by an abandoned quarry pit that occupies roughly one third of the site, in the 6 southeastern corner. The depression of the pit extends approximately ten feet in depth at its 7 deepest point. The remaining portion of the site is predominantly flat to slightly sloping (at 8 approximately 12%) in the direction of the quarry depression. The arena is currently located on 9 the western side of the site. Commonwealth Road acts as a major channel for surface runoff 10 water from a large contributory area during medium to large flood events. During rain events, 11 surface water streams down Commonwealth Road and into storm drains located at the 12 intersection of Commonwealth Road and Middle Road. The storm drain diverts the water north 13 toward Garapan and into a large surface water outfall that enters the lagoon near the Dai Ichi 14 Hotel. The area of restoration for this alternative thus may extend north of the study area 15 indicated on Figure 7. The contributory area for surface flow in this area includes many unpaved areas in the upper reaches of the watershed, leading to large amounts of sediment transport from 16 17 the upper reaches of the watershed to the lagoon. During medium to large rain events, the 18 current storm drain is insufficient to handle the amount of flow that occurs, resulting in severe flooding at the intersection of Commonwealth Road and Middle Road, and the surrounding 19 20 areas. The land required for the site is currently privately owned.

#### 21 5.5 REAL ESTATE REQUIREMENTS

- 22 USACE Civil Works policy requires the local sponsor provide all LERRD for the project
- 23 construction, operation, and maintenance of the proposed action.
- 24 The China House site would require acquisition of the entire lot (Parcel 1833) which is
- approximately 12,550 square meters (m<sup>2</sup>), and an estimated 1,823 m<sup>2</sup> of channel improvement 25
- 26 easement for the out-flow works. Additionally, permanent access encompassing approximately
- 27 972 m<sup>2</sup> from Middle Road to the site would be required since there is no direct public access to
- 28 the China House site.
- The Quartermaster site would require acquisition of the entire Parcel 1826-4 (approximately 29
- 30 1,507 m<sup>2</sup>), partial acquisition of Parcel 1826-R1 (approximately 2,000 m<sup>2</sup>, 3,780 m<sup>2</sup>, and 6,113
- 31 m<sup>2</sup> for the two-year, five-year, and 10-year design, respectively), and partial acquisition of Parcel
- 1822 (approximately 946 m<sup>2</sup>, 2,000 m<sup>2</sup>, and 2,500 m<sup>2</sup> for the two-year, five-year, and 10-year 32
- design, respectively). In addition, the Quartermaster site would require approximately 3,400 m<sup>2</sup> 33
- 34 for channel improvements to an existing swale.
- 35 The Cock Fight Arena site would require acquisition of the entire Parcel 078 D 01
- 36 (approximately 5,378 m<sup>2</sup>), partial acquisition of Parcel 25-4 (approximately 10,080 m<sup>2</sup>), and
- partial acquisition of Parcel EA 693-2 (approximately 1,140 m<sup>2</sup>). The cock fight arena, which is 37
- an approximately 12,500-m<sup>2</sup> structure located at the site would be acquired and demolished for 38
- 39 the project. In addition to the land required at the site, land area to accommodate approximately
- 40 2,200 linear feet of an 18-inch RCP for the diversion outlet flow is required for the Cock Fight
- 41 Arena site.

- 1 The Ouartermaster and Cock Fight Arena sites are both located on public roads and would have
- 2 readily available access for the implementation of the project. Additional information regarding
- 3 real estate requirements and associated costs for the project are included in the Real Estate
- 4 Planning Report (Appendix G).

13

14

#### 5.6 OPERATION AND MAINTENANCE

- 6 Implementation of detention basin systems would require ongoing maintenance in order to assure
- 7 their efficient and proper function. The local project sponsor will be responsible for the
- 8 operation and maintenance of the completed project. The following maintenance activities
- 9 should be conducted on an annual basis before the rainy season:
- 10 cutting of grass and weed removal in and around the basin and within the outlet swales;
- removal of accumulated sediment from the basin bottom to maintain designed capacity; 11 12 and
  - clearing of the basin inlet of debris, leafs, and any sediment.

#### 5.7 DESCRIPTION OF COSTS

- 15 Each detention basin was characterized in terms of its cost and expected benefits.
- preliminary CE/ICA was performed using cost estimates associated with each detention basin, 16
- 17 which was based on the sum of the real estate cost and construction cost. Real estate costs were
- 18 based on the Real Estate Planning Report prepared for the study (Appendix G). Construction
- 19 costs were developed for features identified in the Preliminary Drainage Design Report prepared
- 20 for the study (Appendix F). It is important to note that the estimated construction costs for the
- 21 detention basins do not include annual operation or maintenance costs. A recommended plan for
- 22 regular basin maintenance is included in Section 5.6.
- 23 Further refinement of the costs for a more realistic and accurate estimates were only completed
- 24 for the three alternatives which were retained following the preliminary CE/ICA. The three
- 25 alternatives retained for the final ICA were subjected to an Abbreviated Cost and Schedule Risk
- Analysis. From this risk analysis, the contingencies were calculated from a risk register with risk 26
- 27 elements collaborated on from the PDT. Once the contingencies were calculated, they were
- 28 placed in the Total Project Cost Summary (TPCS) along with the construction cost; real estate
- 29 cost; the planning, engineering, and design cost; and the construction management cost. All of
- 30 these costs were added together, along with the monies spent (i.e., the feasibility study cost) and
- 31 an escalation factor, to determine the total project cost of each alternative. TPCSs that include a
- 32 detailed breakdown of the total projects costs as well as the risk registers used to calculate the
- 33 contingencies for each alternative are included in Appendix H.
- 34 Table 5 shows the breakdown of the total project cost for each of the three alternatives retained
- 35 for the final ICA. Prefixes C, Q, or A refers to the China House, Quartermaster, or Cock Fight
- 36 Arena site, respectively. Numeral 0, 1, 2, or 3 refers to the no action, two-year, five-year, or
- 37 10-year design level, respectively. For example, A1 is the Cock Fight Arena 2-year design while
- 38 Q0 refers to the Quartermaster no action alternative.

7

26

27

Table 5: Cost Breakdown of Alternatives Retained for Final ICA

Combination	Construction Cost	Real Estate Cost	Planning, Engineering, and Design	Construction Management	Operation and Maintenance	Feasibility Study	Total Project Cost
C0 Q0 A1	\$2,986,000	\$1,062,000	\$2,345,000	\$576,000	\$5,600	\$1,483,000	\$8,451,000
C2 Q0 A1	\$7,769,000	\$1,680,000	\$2,561,000	\$785,000	\$9,800	\$1,483,000	\$14,277,000
C2 Q2 A1	\$10,723,000	\$2,288,000	\$2,674,000	\$912,000	\$12,300	\$1,483,000	\$18,079,000

#### Notes:

- 1. Construction and real estate costs include contingencies (see Appendix H).
- 2. Construction costs include post-construction monitoring costs.
- 3. Operation and maintenance costs shown are annual costs and are not included in the total project cost. The local project sponsor is responsible for providing operation and maintenance costs associated with the proposed detention basins.

#### 5.8 DESCRIPTION OF BENEFITS

- 8 Identification of a quantifiable environmental output serves to establish a measure of success for
- 9 the implemented restoration plan. Ideally, an environmental output should be quantifiable and
- 10 able to be documented. Commonly used environmental outputs are acres of habitat restored and
- habitat units restored (e.g., number of fish, plants, or acres of restored habitat).
- 12 The total lagoon acreage assumed to fall within the potential restoration zone includes the area of
- the lagoon from Quartermaster Road at the southern end to just beyond the Garapan Fishing
- 14 Dock at the northern end, the shoreline, and the extent of the seasonal macro-algal zone which
- occurs approximately 1,500 feet from the shoreline (Figure 7). This area totals approximately
- 16 371 acres. Implementation of restoration alternatives will most likely positively impact waters
- beyond this area, but for evaluation purposes these boundaries were chosen because they will see
- 18 the most dramatic changes.
- 19 For this study, the habitat restoration does not target a single fish or plant species. The premise
- 20 behind this restoration study is to restore the habitat of the entire nearshore lagoon aquatic
- 21 ecosystem. Therefore, the single habitat unit comparison developed for this study is based on the
- 22 number of acres of lagoon aquatic ecosystem (i.e., a nearshore, shallow, marine environment
- 23 with low abundances of seasonal macroalgae, and high abundances of sand and coral, with some
- 24 nearshore seagrass beds) that are restored. For the purpose of the CE/ICA, the following broad
- 25 habitat type category has been identified and quantified.
  - Nearshore lagoon habitat (1 lagoon habitat unit [LGHU] = 1 equivalent acre of restored nearshore lagoon water habitat).
- 28 Restored nearshore lagoon habitat refers to areas of the lagoon that would be positively impacted
- by the restoration alternative. One equivalent acre consists of the following quantifiable
- 30 components. It is assumed that improvement of the following components of the lagoon is
- 31 indicative of a restored and more natural condition of the lagoon state:
- 1. Decrease in percent cover of nearshore nuisance macroalgae.
- 2. Decrease in percent cover of nearshore and mid-lagoon seasonal macroalgae.
- 3. Lowered turbidity of nearshore water.

- 4. Decrease in incidents of microbial contamination of nearshore water.
  - 5. Decrease in nutrient concentration of nearshore lagoon water.
- While these components are quantifiable and will be used in conjunction with other components
- 4 to gauge the success of implemented restoration alternatives, it is not practical to assign
- 5 numerical values or projected goals to these components for purposes of the CE/ICA. It is also
- 6 important to note that success of the detention basins will be augmented by local implementation
- 7 of land use controls and other BMPs for contaminant reduction in the West Takpochao
- 8 watershed.

- 9 The number of LGHUs expected to be restored was calculated by first estimating the lagoon
- acreage that would be impacted by constructing each detention basin at the three sites. Each of
- 11 the three proposed detention basin designs has three different storage capacities of freshwater,
- and it is unlikely that the smallest basin would have a positive effect on all 371 acres of the
- 13 restoration zone. For each variable evaluated below, there is thus some application of the
- reduction factor "Y", calculated as:
- Y = (Average annual reduction in runoff for the detention basin design / average annual reduction in runoff for the 10-year detention basin design).
- 17 Appendix I includes the calculations used to estimate the average annual reduction in runoff for
- 18 each drainage basin.
- 19 The overall benefit was estimated by evaluating several factors such as hazardous waste runoff,
- sedimentation, storage capacity of the different basins and basin sizes, and runoff from PCAs.
- 21 Each of the following factors is expressed in terms of the LGHUs restored, in equivalent acres.
- 22 Individual tables showing how each of the factors was calculated are included in Appendix I.
- 23 FW: acres of lagoon restored by reducing freshwater runoff. FW was calculated by the
- 24 following four-step process:
- 1. divide the average annual runoff reduction of the basin by the average annual runoff reduction of that basin's 10-year estimate (Reduction factor "Y");
- 27 2. divide the drainage area for the basin by the total watershed area and convert to a percentage;
- 3. multiply the percentage calculated in step 2 by 371 (the total lagoon acres within the restoration zone); and
- 4. multiply the result of step 3 by the result of step 1. The result, FW, is an estimate of the acres of lagoon restored by reducing freshwater runoff for each of the nine potential designs.
- 34 As an illustrative example, the China House detention basin storage capacity of the two-year
- design was calculated at 4.765 acre-feet (ac-ft) (see Appendix F). FW for the two-year China
- House design was calculated as follows:

- 1 1. Y = 3.38315 / 6.35629 = 0.53225
- 2 2. 344 / 2000 \* 100 = 17.2%
- 3 344 is the drainage area for the China House detention basin, while 2000 is the drainage area of the entire watershed within the study area;
- 5 3. 371 acres \* 0.172 = 63.812 acres
- 371 is the total acreage of the "restoration zone" within the lagoon. It was multiplied by 0.1720, the percentage of the China House basin drainage area comprising the entire watershed area within the study area; and
- 9 4. 63.812 acres \* 0.53225 = 33.964 acres = FW
- 63.812 acres is the total acres of lagoon estimated to be restored by implementing the China House design. However, the two-year design does not have the same storage capacity as the 10-year design, and thus the factor calculated in step 1 is applied to account for the difference in storage capacity. FW for the China House two-year design is 33.964 acres.
- R: acres of lagoon restored by reducing runoff from runoff PCAs. This factor is based on the inventory of PCAs (Appendix C.5). To calculate R, the number of runoff PCAs within the drainage area for each drainage basin was divided by the total number of runoff PCAs identified
- in the study area. This factor was multiplied by the reduction factor Y, and by 371 (the total
- lagoon acres within the restoration zone). The result, R, is an estimate of the acres of lagoon
- 20 restored by reducing runoff PCAs for each of the nine potential detention basin designs.
- 21 H: acres of lagoon restored by reducing runoff from hazardous waste PCAs. This factor is
- 22 also based on the inventory of PCAs. To calculate H, the number of hazardous waste PCAs
- 23 within the drainage area for each detention basin was divided by the total number of hazardous
- waste PCAs identified in the study area. This factor was multiplied by the reduction factor Y,
- and by 371 (the total lagoon acres within the restoration zone). The result, H, is an estimate of
- the acres of lagoon restored by reducing hazardous waste PCAs for each of the nine potential
- designs.
- 28 S: acres of lagoon restored by reducing sedimentation. This factor is based on estimating
- 29 the number of acres of unvegetated and/or unpaved land within the drainage area for each
- detention basin, and within the entire study area, using Google Earth. To calculate S, the
- 31 estimated number of acres of unvegetated/unpaved land within the drainage area for each
- 32 detention basin was divided by the estimated number of acres of unvegetated/unpaved land
- 33 within the entire study area. This factor was multiplied by the reduction factor Y, and by 371
- 34 (the total lagoon acres within the restoration zone). The result, S, is an estimate of the acres of
- 35 lagoon restored by reducing sedimentation for each of the nine potential designs.

- 1 In addition to the runoff and hazardous waste PCAs, the PCA inventory identified several
- 2 sedimentation and nutrient PCAs within the study area (Appendix C.5). Because of the limited
- 3 number of nutrient PCAs that were identified within the study area, the calculation of nutrient
- 4 runoff was not considered in the LGHU calculation. The small number of nutrient PCAs was
- 5 considered to have a negligent impact on the outcome. The sedimentation factor calculation was
- 6 based on Google Earth and not on the number of sedimentation PCAs to include
- 7 unvegetated/bare land in the upper watershed within the study area that were not identified
- 8 during the PCA inventory. This method was considered to result in a more accurate estimate of
- 9 sedimentation that occurs within the study area.
- 10 An CE/ICA can only be conducted by comparing one cost parameter with one output parameter.
- 11 The four factors described above had to be combined into one output parameter. To accomplish
- this, a derived variable was calculated by weighting each of the four factors described above.
- 13 The derived variable LGHUs was calculated by the formula below.
- 14 LGHUs = 0.7FW + 0.1R + 0.1H + 0.1S
- 15 FW was assigned the heaviest weight because it is the primary vehicle for transportation of
- pollutants such as nutrients, hazardous materials, and sediment. The three other components
- were assigned equal weights because they all contribute to degradation of the lagoon habitat,
- albeit through different mechanisms.

- 19 Table 6 shows the calculated and derived variables used to conduct the preliminary CE/ICA.
- 20 The Cock Fight Arena site had identical storage capacities for the two-year and five-year
- designs, thus the values in the table are identical for the two-year and five-year design levels.

1

Table 6: Derived Variables Used to Conduct the CE/ICA

Management Measure	Site/ Design Level	Cost Estimate*	FW (acres)	R (acres)	H (acres)	S (acres)	LGHUs (equivalent acres)
C1	China House Two-Year	\$2,164,900	33.96	60.76	43.20	83.25	42.50
C2	China House Five-Year	\$3,376,000	61.27	109.61	77.93	150.19	76.66
C3	China House 10-Year	\$4,810,800	63.81	114.15	81.16	156.41	79.84
Q1	Quartermaster Two-Year	\$1,485,800	9.30	13.13	10.67	24.33	11.32
Q2	Quartermaster Five-Year	\$2,118,000	18.29	25.82	20.98	47.85	22.27
Q3	Quartermaster 10-Year	\$2,757,500	20.22	28.54	23.19	52.89	24.62
A1	Cock Fight Arena Two-Year	\$2,747,800	74.29	27.68	44.97	110.64	70.33
A2	Cock Fight Arena Five-Year	\$5,231,500	74.29	27.68	44.97	110.64	70.33
A3	Cock Fight Area 10-Year	\$5,686,300	76.61	28.54	46.38	114.10	72.53

- FW = Acres of lagoon habitat restored by reducing freshwater runoff.
- R = Acres of lagoon habitat restored by reducing runoff from runoff PCAs identified during the study.
- H = Acres of lagoon habitat restored by reducing runoff from hazardous waste PCAs identified during the study.
- S = Acres of lagoon habitat restored by reducing sedimentation.
- 2345678 LGHUs = lagoon habitat units, or equivalent acres of lagoon restored by implementing the chosen drainage basin design. This is a derived variable based on FW, R, H, and S.
- \*Cost estimate is based on the sum of the construction cost and real estate cost prior to adding contingencies.

#### 9 COST EFFECTIVENESS/INCREMENTAL COST ANALYSIS

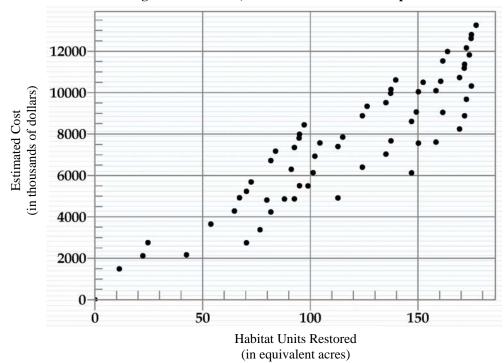
- 10 Economic analysis for environmental planning consists of two analytical processes that together
- 11 form the CE/ICA. CE analysis identifies the least cost alternative for each level of
- environmental output. Following the CE analysis, an ICA is performed to show the incremental 12
- 13 change in project cost with increasing levels of environmental output. The program relies upon
- 14 IWR Planning Suite Decision Support Software to complete the analyses as part of the following
- 15 four step process:
- 1. identify least-cost combinations; 16
- 17 2. identify the cost-effective combinations;
- 18 3. apply the ICA to the combinations identified in step 2 above; and
- 4. evaluate the combinations retained during step 3 above. 19

#### 20 5.9.1 Least-Cost Combinations

- 21 The cost estimates and LGHU variables from Table 6 were used to conduct the preliminary
- 22 CE/ICA. IWR-Planning Suite first builds all possible alternative plan combinations based on the
- 23 number of individual restoration sites, whether the sites can be combined with each other (i.e.,
- 24 implemented in tandem), or whether any of the sites are dependent on each other. Based on the
- assumptions that any or all of the three sites can be developed concurrently, at the no-build, 25
- two-year, five-year, or 10-year design level, there are 64 different plan combinations. All 64 26
- 27 combinations are shown on Figure 8 and listed in Appendix J.



Figure 8: All Plans, Estimated Cost versus Output



4 After building all possible plan combinations, inefficient combinations were eliminated by identifying combinations with identical levels of output and eliminating the higher cost 5

alternative. This process results in the identification of a least-cost combination for each level of 6

7 output produced by the initial list of combinable measures. Forty-eight (48) least-cost

8 combinations were identified in this step.

# **5.9.2** Cost-Effective Combinations

10 The 48 least-cost combinations identified in step 1 were analyzed for CE by identifying and 11

eliminating those combinations which produce a lower level of output for the same or greater

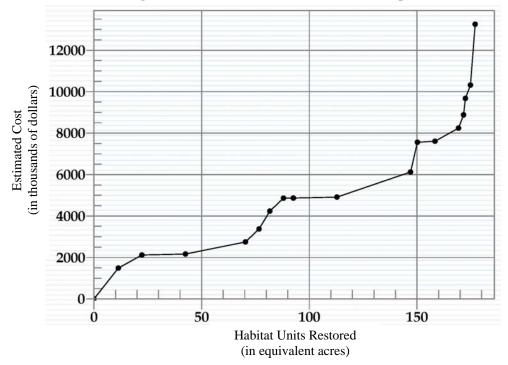
12 cost than another combination. The CE analysis indicates that there are 18 cost-effective plans.

The 18 cost-effective plans are shown in Figure 9 and listed in Appendix J.

14

13

Figure 9: Cost Effective Plans, Cost versus Output



23

4

5

6 7

8

9

10

11

# **5.9.3** Preliminary Incremental Cost Analysis

The 18 remaining cost-effective combinations were subjected to a preliminary ICA in which the incremental cost per output between successively larger (i.e., more output) combinations are determined, and the best buy plans as those combinations for which the incremental cost per output is lowest for a particular output level is identified. Seven best buy plans (i.e., the plan combinations with the lowest incremental cost per output level) were retained as a result of this analysis. These seven best buy plans are listed in Table 7 and shown in Figure 10. The tables and graphs generated with the IWR Planning Suite are included in Appendix J.

12

13

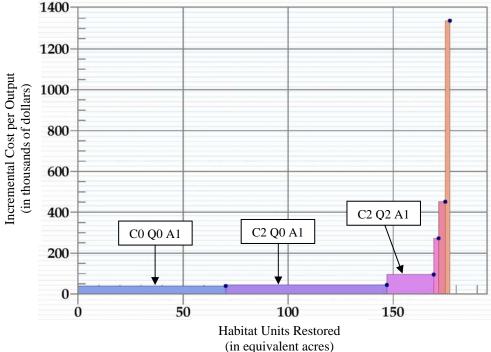
Table 7: Best Buy Plans, Preliminary Incremental Cost Analysis

Combination	Cost Estimate*	LGHUs (equivalent acres)	Average Cost per LGHU	Incremental Cost	Incremental Output (equivalent acres)	Incremental Cost per Output
C0 Q0 A0	\$0.00	0	\$0	\$0	0	\$0
C0 Q0 A1	\$2,747,800	70.33	\$39,069.0	\$2,747,800	70.33	\$39,069.0
C2 Q0 A1	\$6,123,800	146.99	\$41,660.2	\$3,376,000	76.66	\$44,037.5
C2 Q2 A1	\$8,241,800	169.26	\$48,692.6	\$2,118,000	22.27	\$95,114.1
C2 Q3 A1	\$8,881,300	171.61	\$51,752.8	\$639,500	2.35	\$272,359.5
C3 Q3 A1	\$10,316,100	174.79	\$59,021.0	\$1,434,800	3.18	\$451,621.0
C3 Q3 A3	\$13,254,600	176.98	\$74,8915	\$2,938,500	2.19	\$1,337,505.7

\*Cost estimate is based on the sum of the construction cost and real estate cost prior to adding contingencies.



Figure 10: Best Buy Plans, Preliminary Incremental Cost Analysis



#### 5.9.4 Evaluation of Alternative Plans

In accordance with ER 1105-2-100, the seven best buy plans were evaluated against the four criteria outlined in the Principles and Guidelines adopted by the Water Resources Council: completeness, efficiency, effectiveness, and acceptability. According to ER 1105-2-100, "completeness is the extent to which the alternative plans provide and account for all necessary investments or other actions to ensure the realization of the planning objectives, including actions by other Federal and non-Federal entities. Effectiveness is the extent to which the alternative plans contribute to achieve the planning objectives. Efficiency is the extent to which an alternative plan is the most cost effective means of achieving the objectives. Acceptability is the extent to which the alternative plans are acceptable in terms of applicable laws, regulations and public policies." Each combination was given a rating (i.e., poor, fair, good, very good, and excellent) for each criterion according to the ability of the alternative to achieve the objectives of the criterion. Table 8 presents the comparative analysis and ratings of the seven best buy plans.

The no action combination (C0 Q0 A0) was given the lowest ranking for all four criteria because it does not meet the study objectives and would not result in any benefits to the environment or the local economy. For the "Completeness" criteria, all combinations (besides the no action combination) was given a "Good" ranking considering that all plans will be implemented in consultation with and with the corporation of the local sponsor, and will also take into account any existing or future plans that would have any impacts on the objectives of this study.

For the "Efficiency" criteria, each combination was given a ranking based on its incremental cost per output (see Table 7 and Figure 10). The last three combinations (C2 Q3 A1, C3 Q3 A1, and

- 1 C3 O3 A3) were given the lowest ranking since their incremental costs are significantly higher
- 2 than the remaining combinations, adding merely two or three equivalent acres of restoration area
- 3 for a cost of over \$600,000 to almost three million dollars.
- 4 For the "Effectiveness" criteria, each combination was given a ranking based on the expected
- 5 equivalent acres of restoration area under each alternative. The last four combinations (C2 Q2
- 6 A1, C2 Q3 A1, C3 Q3 A1, and C3 Q3 A3) are expected to restore 169.26 to 173.98 equivalent
- acres of the lagoon. In addition, these combinations include the construction of a detention basin 7
- 8 at all three proposed sites, which in turn will result in restoration of all three areas of the lagoon;
- 9 therefore, was given the highest rankings.
- 10 For the "Acceptability" criteria, the highest rankings were given to all combinations (except for
- the no action combination) since all plans are expected to be in compliance with existing laws, 11
- 12 regulations, and public policies.

**Table 8: Best Buy Plans, Comparative Analysis** 

Combination	Completeness	Efficiency	Effectiveness	Acceptability
C0 Q0 A0	Poor	Poor	Poor	Poor
C0 Q0 A1	Good	Excellent	Good	Excellent
C2 Q0 A1	Good	Very Good	Very Good	Excellent
C2 Q2 A1	Good	Good	Excellent	Excellent
C2 Q3 A1	Good	Poor	Excellent	Excellent
C3 Q3 A1	Good	Poor	Excellent	Excellent
C3 Q3 A3	Good	Poor	Excellent	Excellent

14 15 The 5-tiered scale is a subjective scale that includes the following categories in decreasing order used to indicate the degree to 16 which criteria are met: Excellent, Very Good, Good, Fair, and Poor.

- 17 The no action combination (C0 Q0 A0) does not meet the study objectives and is considered to
- 18 be unresponsive to the needs of the local sponsor; therefore, is eliminated from further
- 19 evaluation. The remaining six combinations, with cost estimates and LGHU output ranging from
- 20 \$2,747,800 to \$13,254,600 and 70.33 to 176.98 equivalent acres, respectively are evaluated
- 21 below.
- 22 The first combination (C0 Q0 A1) results in 70.33 equivalent acres of restored area and would
- 23 most likely impact the northern part of the lagoon (Figure 7) where water quality violation
- 24 frequencies and metals contamination are observed to be highest based on currently available
- 25 baseline data of the lagoon. Since this combination does not involve the construction of
- 26 detention basins at the China House site or the Quartermaster site, areas to be restored with this
- 27 alternative is likely to be more pronounced within the northern section of the study area
- 28 compared to the southern portion of the study area. Compared to the without-project conditions,
- 29 the northern part of the study area would receive less input of nutrient and sediment load as well
- 30 as experience less frequencies of microbial contamination within the nearshore zone. Less input
- 31 of nutrient and sediment load would allow slower-growing coral and seagrass to develop within

9

10

11 12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

29

30

31

32

33 34

35

36

37

38

the restoration zone and would prevent the area to become completely replaced by a macroalgae dominant community. This would result in more habitats available for fish and invertebrate species to thrive within the restoration zone. Reduction in the amount of nutrient and sediment input to the lagoon as well as the frequency of microbial contamination is expected to occur as soon as the alternative measure is implemented. Changes in the ecosystem structure of the study area may take up to several years until it is observed. This alternative would contribute to achieve the study objectives and is cost efficient, therefore is retained for further consideration.

The second combination (C2 Q0 A1) results in a total of 146.99 equivalent acres of restored area within the northern part of the lagoon (Figure 7) where water quality violation frequencies and metals contamination are observed to be highest as well as within the mid-portion of the lagoon (Figure 7). Since this combination does not involve the construction of a detention basin at the Quartermaster site, the very southern part of the study area is less likely to be impacted by this alternative. Compared to the without-project conditions, the northern part and the mid-section of the study area would receive less input of nutrient and sediment load as well as experience less frequencies of microbial contamination within the nearshore zone. As with the first combination, less input of nutrient and sediment load would allow slower-growing coral and seagrass to develop within these restoration zones and would prevent the area to become completely replaced by a macroalgae dominant community in the future, resulting in increased habitats that are available for fish and invertebrate species to thrive in. Reduction in the amount of nutrient and sediment input to the lagoon as well as the frequency of microbial contamination is expected to occur as soon as the alternative measure is implemented, and changes in the ecosystem structure of the study area is expected to take up to several years until it is observed. This alternative would contribute to achieve the study objectives and is cost efficient, therefore is retained for further consideration.

The third combination (C2 Q2 A1) results in a total of 169.26 equivalent acres of restored area within portions of the lagoon throughout the study area (Figure 7) since it involves the construction of a detention basin at all three proposed sites. Compared to the without-project conditions, all three restoration zones within the lagoon would receive less input of nutrient and sediment load as well as experience less frequencies of microbial contamination within the nearshore zone. The significant reduction in input of nutrient and sediment load to the lagoon by implementing this alternative would allow slower-growing coral and seagrass to develop, providing increased habitats available for fish and invertebrate species to thrive in. As with the previous two alternatives, reduction in the amount of nutrient and sediment input to the lagoon as well as the frequency of microbial contamination is expected to occur as soon as the alternative measure is implemented, and changes in the ecosystem structure of the study area is expected to take up to several years until it is observed. The larger output expected under this alternative corresponds to an increase in cost; however, it is retained for further evaluation considering that a significant portion of the lagoon is expected to be restored.

The last three combinations; C2 Q3 A1, C3 Q3 A3, result in a total of 171.61, 174.79, and 176.98 equivalent acres of restored area, respectively. Restoration zones for these alternatives would include areas throughout the study area since they would entail construction of detention basins at all three proposed sites. Compared to the without-project conditions, these

alternatives would result in reduction of input of nutrient and sediment to the lagoon as well as reduction in frequencies of microbial contamination within the nearshore zone. These outputs are expected to be observed immediately following the construction of the detention basins and would prevent the shift to a macroalgae dominated community within the restoration zones, allowing for coral and seagrass communities to develop, which in turn, will provide increased habitats for fish and invertebrate species within the area. The outputs expected under these alternatives are large; however the corresponding incremental costs are significantly high. These alternatives do not provide a cost-efficient means of achieving the study objectives; therefore are eliminated from further consideration.

# 5.9.5 Final Incremental Cost Analysis

The three alternatives retained for further consideration were subjected to an Abbreviated Cost and Schedule Risk analysis. Once the contingencies were calculated, they were placed in the TPCS to determine the total project cost for each alternative. The final ICA was performed using annualized total project costs instead of the cost estimates that were used for the preliminary ICA as well as using average annual outputs (Table 9 and Figure 11). The three alternatives are independent of each other, thus the output of each alternative is not dependent on any other alternative nor are the alternatives combinable. Annualization of total project costs and outputs were conducted using the IWR Planning Suite annualization tool. The tables and graphs generated with the IWR Planning Suite are included in Appendix J.

**Table 9: Final Incremental Cost Analysis** 

Combination	Average Annual Cost	Average Annual LGHUs (equivalent acres)	Average Annual Cost per LGHU	Incremental Annual Cost	Incremental Annual Output (equivalent acres)	Annual Incremental Cost per Output
C0 Q0 A1	\$300,375	4.22	\$71,182	\$300,375	4.22	\$71.18
C2 Q0 A1	\$458,532	8.82	\$51,991	\$158,157	4.60	\$34.38
C2 Q2 A1	\$723,889	10.16	\$71,280	\$265,356	1.34	\$198.59



Figure 11: Final Incremental Cost Analysis, Incremental Cost versus Output C2 Q2 A1 Annual Incremental Cost (in thousands of dollars) per Output C0 Q0 A1 C2 Q0 A1 Average Annual Habitat Units Restored

# 5.9.6 Plan Comparison

The first combination (C0 Q0 A1) has the lowest annual cost of all three final alternatives, which also corresponds to the lowest annual number of equivalent acres restored. The restoration area would be mostly observed within the northern section of the study area. The second combination (C2 Q0 A1) adds 4.6 annual equivalent acres of restored area in two distinct areas of the lagoon, which is a two-fold increase compared to the first combination. The jump in annual output is matched by an increase in annual cost from \$300,375 to \$458,532. Although the cost is much higher compared to the first combination, the average cost per LGHU and incremental cost per output is the lowest of all three final combinations.

(in equivalent acres)

The third combination (C2 Q2 A1) is the only combination that includes all three proposed detention basin sites. The incremental cost per output for this combination is much higher than the first two combinations. The increase in the annual output (from 8.82 to 10.16 equivalent acres) compared to the second combination corresponds to a double in annual incremental cost per output (from \$34.38 to \$198.59). This alternative is considered the most preferred considering that all three restoration zones corresponding to the three detention basin sites will be restored. However, the increase in annual incremental cost per output is not matched by its level of incremental output; therefore, this combination is considered the least preferred from a cost perspective.

#### 5.10 SELECTION OF PREFERRED ALTERNATIVE

Comparison of the three alternatives that were retained for the final ICA was carefully reviewed to select the preferred alternative. The comparison discussed in the previous section indicates that the third alternative (C2 Q2 A1) would result in the greatest amount of output but with a high cost. The first alternative (C0 Q0 A1) would be the most cost efficient; however, would have the least amount of output. The second combination (C2 Q0 A1) was considered to be

- 1 inbetween the first and third alternatives, with a cost and output inbetween the two. The average
- 2 cost per LGHU and incremental cost per output was the lowest; therefore, the second
- 3 combination was considered the most cost efficient when considering the unit cost per restored
- 4 acre of the lagoon.
- 5 As discussed earlier in Section 5.9.4, the completeness and acceptability of all three final
- 6 alternatives are considered to be equal. Efficiency of the three alternatives was ranked based on
- 7 their incremental cost per output, with the first alternative (C0 Q0 A1) having the highest ranking
- 8 based on its low cost and the third alternative (C2 Q2 A1) having the lowest ranking based on its
- 9 high cost. Effectiveness of the three alternatives was ranked based on the expected equivalent
- acres of restoration area under each alternative, with the third alternative (C2 Q2 A1) given the
- highest ranking based on its highest amount of output and the first alternative (C0 Q0 A1) having
- the lowest based on the least amount of output expected.
- 13 Based solely on cost, the first alternative (C0 Q0 A1) was considered the most preferred. The
- second and third alternatives (C2 Q0 A1 and C2 Q2 A1) were preferred over the first
- 15 combination because they involved construction of a detention basin at more than just one site,
- which would allow restoration in more than one area of the lagoon. The first alternative involves
- 17 construction of one detention basin at the Cock Fight Arena site, which corresponds to
- restoration within the northern section of the study area.
- 19 Because of funding constraints, the CNMI preferred alternative was the first alternative. The
- 20 PDT went back to review the existing data to determine whether it would be worth investing in a
- 21 project that involves construction of a single detention basin at the Cock Fight Arena site rather
- 22 than selecting an alternative that would involve construction of multiple detention basins that
- would result in restoration of more than one section of the study area.
- 24 Review of currently available baseline data indicates that water quality violation frequencies and
- 25 metals contamination are observed to be the highest within the northern section of the lagoon.
- The drainage area for the Cock Fight Arena site is the largest of all three sites (Figure 7), and it is
- 27 expected to result in a measurable improvement of the lagoon state by capturing a majority of
- 28 runoff that reaches Saipan Lagoon. Although the first alternative has the least amount of
- 29 expected equivalent acres of restoration area, the degree to which the lagoon will be restored is
- 30 considered to be significant considering that degradation is most advanced within the northern
- 31 section of the study area where restoration is expected to take place under this alternative. The
- 32 selected plan will restore 70.33 equivalent acres of lagoon habitat at an estimated total project
- selected plan win restore 70.33 equivalent acres of lagoon habitat at an estimated total pro-
- cost of \$8,451,000. Table 10 shows the cost breakdown of the preferred alternative.

Table 10: Cost Breakdown of Preferred Alternative

Preferred Alternative	Construction Cost*	Real Estate Cost*	Planning, Engineering, and Design*	Construction Management*	Feasibility Study	Total Project Cost
C0 Q0 A1	\$2,986,000	\$1,062,000	\$2,345,000	\$576,000	\$1,483,000	\$8,451,000

\*Costs include contingencies (see Appendix H).

34

### 1 5.11 IMPACTS OF SELECTED PLAN

- 2 The selected plan will restore the lagoon aquatic ecosystem to a less degraded and more natural
- 3 condition. Specific impacts of the selected alternative on various components of the lagoon
- 4 ecosystem, as well as additional benefits are discussed below.

# 5 5.11.1 Ecosystem Enhancement

- 6 The predominant focus of the preferred alternative is to restore the degraded Saipan Lagoon
- 7 aquatic ecosystem. The single most detrimental influence on the lagoon is the influx of
- 8 sediment, nutrient, and contaminant-laden runoff. The implementation of a detention basin
- 9 would serve to improve the overall function and health of the lagoon aquatic ecosystem by
- 10 capturing stormwater prior to it entering the lagoon, and allowing sediment and contaminants to
- settle out before the water is discharged into the lagoon.

# 12 5.11.1.1 Aquatic Ecosystem

- With a reduction of sediment, nutrients, and contaminants entering the lagoon, the aquatic
- ecosystem, including corals, fish, and seagrasses, will function more naturally (see Section 3.1).
- 15 Implementation of controls for runoff will also aid in limiting the otherwise unavoidable further
- degradation of the lagoon with future development within the West Takpochao watershed.
- 17 Ultimately, the intention of the preferred alternative is to reduce nonpoint source pollution, and
- thereby allow the return of seagrass and corals to dominance in currently degraded habitats.

# 19 **5.11.1.2 Endangered Species**

- 20 The Green Sea Turtle and the Hawksbill Sea Turtle, both endangered species, would benefit
- 21 from an increase in quality of the Saipan Lagoon habitats. Green Sea Turtles, in particular, feed
- 22 on seagrass; therefore an increase in healthy seagrass would result in an expansion of potential
- 23 foraging areas.

# **24 5.11.2 Water Quality**

- 25 Restoration of water quality is a key component of the preferred restoration alternative.
- 26 Detention basins serve to improve runoff water quality by allowing sediments and nutrients to
- settle out prior to its transport to the lagoon, leading to an improvement of lagoon water quality.
- 28 In addition to improving aquatic ecosystem function, improved lagoon water quality would be
- 29 conducive to the tourism industry of Saipan. Controlling and treating surface water flow
- 30 entering the lagoon, together with local policy changes that are part of the preferred alternative
- 31 (see Section 5.11.5), would most likely lead to a decrease in microbial contamination that has
- 32 recently become a significant concern for beach front hotels and tourism-related businesses.

# **5.11.3 Flood Control**

- 34 The preferred alternative would offer limited mitigation of localized flooding within the study
- 35 area. Currently, the drainage system within the study area is insufficient to handle even medium
- 36 sized rain events. Collection and conveyance systems that would be implemented for the
- 37 restoration alternative would aid in controlling the localized flooding that occurs frequently in
- 38 the area. These conveyance systems would be a significant improvement over the current
- 39 minimal stormwater drainage system.

# **5.11.4** Recreational/Aesthetic Improvements

1

16

17

18

19

20

21

22

2324

25

2627

28

29

30

31

32

33

34

35

36

37

38

39

40

- 2 The cumulative impact of implementing the preferred alternative could include not only
- 3 preserving the natural environment, but also improving the quality of living for residents, the
- 4 atmosphere for local businesses, and tourist attractions. In particular, reducing the presence of
- 5 nuisance macroalgae is an active issue of concern for the tourism/hotel industry that would be
- 6 improved or resolved in the study area. Reduction of nutrient levels that promote microalgal
- 7 growth, along with reduced input of silt and sediment, would improve water clarity, which is
- 8 another benefit from a recreational perspective.

# 9 5.11.5 Recommended Local Best Management Practice

- 10 It is strongly recommended that the CNMI Government implement the following local BMPs to
- 11 further reduce contamination and degradation of Saipan Lagoon. These BMPs were identified
- based on land-use practices or activities on land that generate a majority of nutrients, sediment,
- or contaminants that reach the lagoon via stormwater runoff (DEQ, 2010). Each of the BMPs
- will result in reduction of at least one or more of these contaminant sources, and will contribute
- towards a less degraded and more natural condition of the lagoon.
  - 1. Pave or armor unpaved roads that contribute a majority of sediment to the lagoon, which would significantly reduce the amount of sediment that is washed into the lagoon via stormwater runoff.
  - 2. Conduct sanitary sewer surveys and repair damaged portions of the sewer system, which would reduce the amount of nutrients and contaminants that reach the lagoon via stormwater runoff or infiltration through the ground.
  - 3. Extend sewer lines to replace septic and cesspool systems within the study area, which would reduce the amount of nutrients and contaminants that reach the lagoon during accidental spills or flooding during large storm events.
  - 4. Implement watershed management measures such as land use control measures, public education, reforestation, etc. in order to control activities that involve clearing of natural vegetation. Clearing of natural vegetation not only disturbs the natural soil, but also renders the land more susceptible to runoff and erosion. Raising public awareness and restoring the natural vegetation will contribute to a watershed that is less susceptible to runoff and erosion, thereby reducing the amount of sediment, nutrients, and contaminants that are directly transported to the lagoon via runoff.
  - 5. Establish BMPs for the island with respect to trash and waste disposal in order to reduce the amount of nutrients or hazardous waste that may leach through the ground or become transported to the lagoon via stormwater runoff.
  - 6. Enforce existing CNMI regulations for sediment and runoff capture for new construction projects in order to control the amount of sediment and runoff generated during ground disturbing activities.
  - 7. Enact land use restrictions on placement of livestock farms and other sources of nutrients, which would contribute to controlling and reducing the amount of nutrients that are washed into the lagoon during rain events.

- 1 Implementation of some or all of these BMPs will enhance the environmental quality of Saipan
- 2 Lagoon; however, the success of this project is not dependent upon implementation of these
- 3 BMPs.

14

15

16

17

18

19

20

21 22

23

24 25

26

27

28

- 4 This DPR includes a post-construction monitoring plan that will measure the success of the
- 5 detention basins for the five years immediately following construction (Appendix K). BMPs
- 6 were not considered in the plan development.
- 7 It may be difficult to distinguish the degree of lagoon restoration attributable to the detention
- 8 basins from the degree of lagoon restoration attributable to the implementation of BMPs. The
- 9 most effective way to individually quantify the benefits is to establish or re-establish the baseline
- 10 conditions of the lagoon immediately following implementation of BMPs. The following
- options provide a suggested framework for considering baseline conditions and evaluating
- 12 project success and BMP success:
  - 1. The data included in this DPR establishes the baseline condition of the Saipan Lagoon aquatic ecosystem prior to implementation of detention basins or BMPs. It will be used as the baseline for measuring success of detention basin installation.
    - 2. If BMPs are implemented prior to the construction of the detention basins, the baseline conditions of the Saipan Lagoon aquatic ecosystem should be reestablished via a new round of sampling (aquatic habitat assessment, water quality parameters, stormwater quality, and sediment delta surveys).
    - 3. If BMPs are implemented concurrently with construction of the detention basins, the first sampling event conducted 'post construction' will be used as the new baseline for evaluating the effectiveness of constructing the detention basins
    - 4. If BMPs are implemented at some point during the five years following construction of the detention basins, the sample data will be evaluated to look for a significant change in the aquatic ecosystem that can be specifically attributed to the BMPs; otherwise the continued improvement of the aquatic ecosystem will be attributed to the construction of the detention basins.

# 5.12 POST CONSTRUCTION MONITORING PLAN

- 29 The data collected during the course of this study will serve as a baseline measurement of
- 30 "before project" conditions. In order to properly and accurately assess the progress of ecosystem
- 31 restoration, it would be best to couple both marine habitat health data with water quality
- 32 measurements. An increase in water quality should be accompanied by a restoration of critical
- ecosystem components. A five-year post-construction monitoring plan (Appendix K) should be
- implemented to compare the aquatic ecosystem before project conditions to the post-construction
- 35 state. Specific components of the plan include:
- weekly assessment of the presence and abundance of nearshore nuisance macroalgae;
- re-assessment of the inshore lagoon area;
- continued weekly nearshore lagoon water sampling, compared to rainfall data;

9

10

11

12

13

14

15

16

17

18 19

20

- stormwater sample collection and analysis at influent and effluent points of the drainage basin(s); and
- resurvey of sediment deltas at Drains 4, 6, and 11.
- The project could be deemed a success if at least five of the following benchmarks were achieved:
- 1. Reduction in the frequency and abundance of nearshore, fast growth nuisance macroalgae (at least a 20% reduction in percent cover or 25% reduction in days of occurrence).
  - 2. Decrease in the abundance of seasonal macroalgae in the nearshore and mid-lagoon regions (at least a 20% reduction in percent cover).
    - 3. Decrease in turbidity of nearshore waters, particularly following storm events (at least a 25% reduction in number of violations of DEQ water quality standards for turbidity).
    - 4. Decrease in microbial contamination in nearshore waters (at least a 25% reduction in number of violations of DEQ water quality standards for microbial contamination).
      - 5. Decrease in nutrient levels in nearshore waters (at least a 25% reduction in number of violations of DEQ water quality standards for nutrients).
      - 6. Decrease in contaminant (i.e., turbidity, microbial, and nutrient) concentrations in stormwater exiting the detention basins (at least a 25% reduction in number of violations of DEQ water quality standards for turbidity, microbial contamination, and nutrients).
      - 7. Decrease in sediment load entering Saipan Lagoon at mitigated drainages (at least a 10% reduction in sediment delta area).
- Table 11 summarizes the benchmarks and their corresponding reduction goals.

**Table 11: Post-Construction Monitoring Benchmarks and Reduction Goals** 

	Monitoring Parameter	Reduction Goal
1	Nearshore, fast growth nuisance	20% reduction in percent cover or
1	macroalgae	25% reduction in days of occurrence
2	Nearshore/mid-lagoon, seasonal macroalgae	20% reduction in percent cover
		25% reduction in number of
3	Turbidity in nearshore waters	violations of CNMI DEQ water
		quality standard
4	Microbial contamination in nearshore	25% reduction in number of
	waters	violations of CNMI DEQ water
	waters	quality standard
		25% reduction in number of
5	Nutrient levels in nearshore waters	violations of CNMI DEQ water
		quality standard
	Contaminant (turbidity, microbial, and	25% reduction in number of
6	nutrient) concentrations in stormwater	violations of CNMI DEQ water
	existing detention basin	quality standards
7	Sediment load entering the lagoon	10% reduction in sediment delta
/	Scannent toda entering the tagoon	area at mitigated drainage

- 1 Achievement of the first two benchmarks is less certain than the remaining five benchmarks
- 2 because factors that are not directly linked to the proposed detention basins such as groundwater
- 3 or other drainages may also affect the outcomes. The last five benchmarks are directly linked to
- 4 the proposed detention basins and should be achieved by the project.
- 5 The following table summarizes the risk register to capture the risk of not reaching these goals
- 6 and risks associated with factors that may have impacts on accomplishing the reduction goals.

**Table 12: Post-Construction Monitoring Risk Register** 

Risk Name	Probability (low, medium, high)	Mitigation	Contingency
Less than five of the benchmark reduction goals met	Medium	<ul> <li>Ensure operation and maintenance of the detention basin (see Section 5.6) is conducted regularly to maintain the designed filtration capacity</li> <li>Ensure local BMPs identified in Section 5.11.5 are implemented</li> </ul>	<ul> <li>Review factors within the study area that may be influencing monitoring parameter</li> <li>Adjust reduction goals or extend monitoring period if necessary</li> </ul>
Large storm event during post- construction monitoring period	High	Ensure operation and maintenance of the detention basin is conducted at all times to ensure maximum capacity	Reevaluate baseline conditions and adjust benchmark goals if necessary.
Large sewage spill during post- construction monitoring period	Low	Ensure sewage system is maintained properly	Reevaluate baseline conditions and adjust benchmark goals if necessary.

- 8 Since unpredicted events or unknown/unpredicted factors may influence the outcome of the project, it is important to allow for adaptive management if it becomes necessary. As stated
- earlier in this section, success of the project is dependent upon proper operation and maintenance
- of the detention basin as well as implementation of local BMPs. In the event that less than five
- of the benchmark reduction goals are met, factors within the study area that may be contributing
- to the increased input of contaminants (nutrients, sediments, or contaminants) will be reviewed,
- and if necessary, the monitoring period may be extended or the reduction goals may be adjusted.
- 15 In case of a large storm event or sewage spill, it may become necessary to reevaluate the baseline
- 16 conditions since these events are expected to impact the monitoring parameters.

# 6. PROJECT IMPLEMENTATION

- 2 The success of the project is highly dependent upon local cooperation and understanding of what
- 3 their roles and responsibilities are during the implementation of the project. The following
- 4 sections identify the project local cooperators and sponsors, as well as their roles and financial
- 5 obligation that will need to be fulfilled.

# 6 6.1 LOCAL COOPERATION

- 7 Local cooperators involved with this project include the following:
- 8 CRMO;
- 9 DEQ;

- 10 DFW;
- CNMI Department of Public Works (DPW); and
- 12 MMT.
- 13 CRMO is the local sponsor for this project. It is the role of the CNMI Government, to fulfill the
- 14 following for the project:
- Provide all LERRD required for the project.
- Provide all access routes and relocations of utilities necessary for project construction, and for operation and maintenance.
- Contribute in cash, the local share of project cost (the Federal contribution limit is five million dollars).
- The local sponsor will be responsible for all operations and maintenance.

This page is intentionally left blank.

7. REFERENCES

Burke, L., D. Bryant, J. McManus, and M. Spalding, 1998. Reefs at Risk. World Resources
 Institute (WRI): 56 p.

- 4 Bishop Museum, 1944. Aerial photographs of Saipan Lagoon.
- Butler, B. and D.G. De Fant, 1991. Archaeological Survey on the Leeward Coast of Saipan:
   Garapan to Oleai. Micronesian Archaeological Survey Report Number 27. July.
- 7 Cloud, D.E., Jr., R.G. Schmidt, and H.W. Burke, 1956. Geology of Saipan, Mariana Islands, USGS, Prof. Paper, 1350:5-54.
- Denton, G.R.W. and J.A. Starmer, 2009. Influence of Stormwater and Wastewater Discharges on the Distribution and Abundance of Heavy Metals in Sediments from Saipan Lagoon.
  Water and Environmental Research Institute of the Western Pacific Annual Technical Report FY 2009.
- 13 DEO. 2002a. CNMI Water Quality Standards. Promulgated in accordance with the 14 Commonwealth Environmental Protection Act, (CEPA), 1982, 2 CMC §§3101 to 3134, 15 Public Law 3-23: the Commonwealth Environmental Amendments Act. 1999. Public Law 16 11-103; and the Commonwealth Groundwater Management and Protection Act, 1988, 2 17 CMC §§3311 to 3333, Public Law 6-12, of the Commonwealth of the Northern Mariana 18 Islands, and under the provisions of the Clean Water Act, P.L. 92-500 (33 U.S.C. 1251 et. 19 seq.).
- DEQ, 2002b. CNMI Water Quality Assessment 305(b) Report, 2002.
- DEQ, 2010. Commonwealth of the Northern Mariana Islands Integrated 305(b) and 303 (d)
  Water Quality Assessment Report. November.
- DLNR, 1998. Summary and Further Analysis of the Nearshore Reef Fishery of the Northern
  Mariana Islands. Federal Aid in Sportfish Restoration Act Project F-1-R-15, Tech.
  Report 98-02.
- Environet, 2003. Rainfall-Frequency Study, Saipan, Commonwealth of Northern Marianas Islands. Report prepared for the U.S Army Corps of Engineers, dated April 2003.
- EPA, 2009. *National Recommended Water Quality Criteria*. Office of Water, Office of Science and Technology. <a href="http://water.epa.gov/scitech/swguidance/standards/current/index.cfm">http://water.epa.gov/scitech/swguidance/standards/current/index.cfm</a>>
- 30 EPA, 2012. Regional Screening Levels for Chemical Contaminants at Superfund Sites. EPA Office of Superfund. May.
- Farrell, D., 1991. The History of the Northern Mariana Islands. CNMI Public School System.
- 33 Goodridge, W., 2009. Last Garment Factory to Close on Saipan. Press Box Press Release.
- 34 <a href="http://www.pressbox.co.uk/detailed/Society/Last\_Garment\_Factory\_">http://www.pressbox.co.uk/detailed/Society/Last\_Garment\_Factory\_</a>
- to Close oo Saipan 270269.html> Accessed December 13, 2011.

- Hoffmann, J.P., R.L. Carruth, and W. Meyer, 1998. Geology, groundwater occurrence, and estimated well yields from the Mariana Limestone, Kagman area, Saipan, CNMI. USGS Water Resources Investigations Report 98-4077, 38p.
- Houk, P., 1999. State of the reef report for 5 sites on Rota Island, CNMI. CNMI DEQ unpublished report.
- Houk, P., 2000. State of the reef report for Saipan Island, CNMI. CNMI DEQ unpublished report.
- Houk, P., 2010. Market-based Fish Surveys: A wealth of information for Micronesia, but are we applying the knowledge. Journal of Micronesian Fishing. Spring Issue: 10-13.
- Houk, P. and R. Camacho, 2010. Dynamics of seagrass and macroalgal assemblages in Saipan Lagoon, Western Pacific Ocean: disturbances, pollution, and seasonal cycles. Botanica Marina 53: 205-212.
- Houk, P. and Van Woesik, R., 2008. Dynamics of shallow-water assemblages in the Saipan Lagoon. Mar. Ecol. Prog. Ser. 356: 39-50.
- Ingersoll, C.G. 1995. Sediment Toxicity Tests. Fundamentals of Aquatic Toxicology, 2nd edition, Rand GM (ed.), Taylor and Francis, Washington, DC, pp. 231-255.
- Karig, D.E., 1971. Origin and Development of Marginal basins in the Western Pacific. J.
   Geophys. Res., 76:2542-2561.
- Littler, M.M. and D.S. Littler, 1988. Structure and role of algae in tropical reef communities. In
   C.A. Lemmbi and J.R. Waaland (eds.), Algae and human affairs, Pages 29 56.
   Cambridge Univ. Press.
- Meijer, A., M. Reagan, H. Ellis, M. Shafiqullah, J. Sutter, P. Damon, and S. Kling, 1982. Chronology of volcanic events in the eastern Philippine Sea in Hayes, D.E. (ed.). The tectonic and gologic evolution of southeast Asian seas and islands: Part 2: Geophysical Monograph 27, American Geophysical Untion, P. 349-359.
- NOAA, 2011. 15-minute precipitation data for Saipan International Airport (2002 through 2010). National Climatic Data Center (NCDC). Download from <a href="http://www.ncdc.noaa.gov/oa/ncdc.html">http://www.ncdc.noaa.gov/oa/ncdc.html</a>
- Ono , K., J.P. Lea, T. Ando, 2002. A study of urban morphology of Japanese colonial towns in Nan'yo Gunto. I. Garapan, Tinian and Chalan Kanoa in Northern Marianas. Journal of Architecture, Planning & Environmental Engineering , no. 556, pp. 333-339. June.
- Pockley, P., 2000. Global Warming Identified as Main Threat to Coral Reefs. Nature, 407(6807), 932.
- 34 R.M. Towill, 1999. Aerial photograph of Saipan Lagoon.
- Weier, J., 2001. Mapping the Decline of Coral Reefs. March. <a href="http://earthobservatory.">http://earthobservatory.</a>
  nasa.gov/Features/Coral/> Accessed June 19, 2013.
- Spoehr, A., 2000. Saipan: The Ethnology of a War-Devastated Island. Saipan: Division of Historic Preservation (Second Edition).

- Starmer, J.A. et al., 2008. The State of Coral Reef Ecosystems of the Commonwealth of the Northern Mariana Islands. In: Ed. Waddell (ed.). The State of Coral Reef Ecosystems of the United States and Pacific Freely Associated States: 2005. NOAA Tech.Mem. NOS NCCOS 11, Silver Spring, MD.
- 5 University of Hawaii, 1945-1976. Aerial photographs of Saipan Lagoon, 1945, 1956, 1969, and 1976(2).
- 7 University of Utah, 2012. Meso West. Weather observations at Saipan International Airport. 8 <a href="http://mesowest.utah.edu/">http://mesowest.utah.edu/</a> Accessed September 2012.
- 9 US Census Bureau, 2000. United States Census 2000. <a href="http://www.census.gov/main/www/cen2000.html">http://www.census.gov/main/www/cen2000.html</a> Accessed December 13, 2011.
- US Census Bureau, 2010. United States Census 2010. <a href="http://2010.census.gov/news/releases/operations/cb11-cn178.html">http://2010.census.gov/news/releases/operations/cb11-cn178.html</a> Accessed December 13, 2011.
- USGS, 2003. Ground-Water Resource of Saipan, Commonwealth of the Northern Marianas
   Islands. By Robert L. Carruth. USGS Water-Resources Investigations Report 03-4178.
- Van der Brug, O., 1985. *Compilation of water resources development and hydrologic data of Saipan, Mariana Islands.* Water Resources Investigation Report, 84-4121.
- Wilkinson, C. (ed.), 2004. Status of Coral Reefs of the World: 2004. Volume 1. Australian Institute of Marine Science. Townsville, Queensland, Australia. 301 p.
- WRC, 1983. Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. Adopted by the WRC (48FR 10250) in 1983.
- Young, Fred J., 1989. Soil Survey of the Islands of Aguijan, Rota, Saipan, and Tinian, Commonwealth of the Northern Mariana Islands. July.

Appendix A
Environmental Assessment,
Saipan Lagoon Aquatic Ecosystem Restoration Study

# DRAFT FINAL ENVIRONMENTAL ASSESSMENT

# SAIPAN LAGOON AQUATIC ECOSYSTEM RESTORATION STUDY

Contract No. DACA83-01-D-0014-0002



Prepared For:



U.S. Army Corps of Engineers Honolulu Engineering District Environet, Inc.

September 2013



# Draft Final Environmental Assessment

# Aquatic Ecosystem Restoration Study at Saipan Lagoon Saipan, Commonwealth of Northern Mariana Islands

Prepared for: U.S. Army Corps of Engineers, Honolulu Engineering District

Prepared by: Environet, Inc.

1286 Queen Emma Street Honolulu, Hawai'i 96813

Contract No. DACA83-01-D-0014-0002

September 2013

# TABLE OF CONTENTS

2	EXEC	CUTIVE SUMMARY	<b>V</b>
3	LIST	OF ACRONYMS	VII
4	1. I	NTRODUCTION	1
5	1.1	Scope and Authority	1
6	1.2	Study Area Location	3
7	1.3	Overview of the Proposed Action	3
8	1.4	Purpose and Need	4
9		1.4.1 Sedimentation	9
10		1.4.2 Water Quality	10
11	1.5	Regulatory Framework	
12	1.6	Public Involvement and Agency Consultation	12
13		1.6.1 Agency Scoping Meetings	12
14		1.6.2 Legislative Meetings	
15		1.6.3 Public Meetings	12
16	2. I	DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIV	/ES 13
17	2.1	Alternatives Considered but Eliminated from Further Analysis	13
18	2.2	Preferred Alternative	
19	2.3	No Action Alternative	
20	<b>3.</b> A	AFFECTED ENVIRONMENT, ENVIRONMENTAL CONSEQUENC	TES
21		MITIGATION	
22	3.1	Geology and Soils	24
23		3.1.1 Existing Conditions	
24		3.1.2 Potential Impacts and Mitigation	
25	3.2	Solid and Hazardous Waste	
26		3.2.1 Existing Conditions	28
27		3.2.2 Potential Impacts and Mitigation	28
28	3.3	Noise	29
29		3.3.1 Existing Conditions	30
30		3.3.2 Potential Impacts and Mitigation	31
31	3.4	Climate and Air Quality	31
32		3.4.1 Existing Conditions	32
33		3.4.2 Potential Impacts and Mitigation	32
34	3.5	Hydrology and Water Quality	32
35		3.5.1 Existing Conditions	33
36		3.5.2 Potential Impacts and Mitigation	36
37	3.6	Traffic and Circulation	36
38		3.6.1 Existing Conditions	36
39		3.6.2 Potential Impacts and Mitigation	37
40	3.7	Biological Resources	38
41		3.7.1 Existing Conditions	38
42		3.7.2 Potential Impacts and Mitigation	40
43	3.8	Historical and Cultural Resources	41

1	3	3.8.1 Existing Conditions	41
2	3	3.8.2 Potential Impacts and Mitigation	41
3	3.9	Land Use	42
4	3	3.9.1 Existing Conditions	
5		3.9.2 Potential Impacts and Mitigation	
6		Visual Aesthetics	
7		3.10.1 Existing Conditions	
8		3.10.2 Potential Impacts and Mitigation	
9		Recreation/Resource Use	
10		3.11.1 Existing Conditions	
11		3.11.2 Potential Impacts and Mitigation	
12		Economic and Social Resources	
13		3.12.1 Existing Conditions	
14		3.12.2 Potential Impacts and Mitigation	
15	3.13	Cumulative Impacts Associated with the Preferred Alternative	47
16	4. RI	ELATIONSHIP TO ENVIRONMENTAL REGULATIONS	49
17	4.1	Federal Clean Water Act	49
18	4.2	Federal Clean Air Act (CAA)	49
19	4.3	Executive Order (EO) – Protection of Coral Reefs	49
20	4.4	Coastal Zone Management Act (CZMA)	49
21	4.5	The Endangered Species Act (ESA)	50
22	4.6	Fish and Wildlife Coordination Act	50
23	4.7	Marine Mammal Protection Act (MMPA)	
24	4.8	Magnuson-Stevens Fishery Conservation and Management Act	
25	4.9	Coastal Resource Management Act	
26	4.10	Executive Order (EO) 13089 on Coastal Reef Protection	
27	4.11	Section 106 National Historic Preservation Act	
28	4.12	EO 12898 – Environmental Justice in Minority Populations and Low-Inco	
29		Populations and EO 13045 – Protection of Children from Environmental I	
30		and Safety Risks	52
31	5. LI	ST OF PREPARERS	55
32	6. RI	EFERENCES	57

1	LIST OF TABLES					
2	Table 1: Summary of Possible Alternative Development Scenarios	17				
3	Table 2: Final Incremental Cost Analysis					
4	Table 3: Summary Comparison of Alternatives					
5	Table 4: OSHA Permissible Noise Exposures	29				
6	Table 5: Typical Noise Sources	30				
7	Table 6: Traffic Count Survey	37				
8	Table 7: CNMI Social and Economic Characteristics	46				
9						
10						
11	LIST OF FIGURES					
12	Figure 1: General Study Area	. 5				
13	Figure 2: Proposed Detention Basins and Drainage Areas	. 7				
14	Figure 3: Preferred Alternative					
15	Figure 4: Surface Geology of Saipan					
16	Figure 5: Water Quality Violation Frequency at Garapan Fishing Dock, 1994-2002					
17	Figure 6: Water Quality Violation Frequency at Monitoring Stations within Study Area					
18	2004-2011					
19	Figure 7: Land Use Plan Reference Map	43				
20						
21	ADDENDICEC					
22	APPENDICES					
23	Appendix A: Preliminary Drainage Design Report					
24	Appendix B: Traffic Data					
25	Appendix C: USFWS Reports					
26	Appendix D: Agency Consultation Letters					
27	Appendix E: Documented Meetings on Saipan					

September 2013

This page is intentionally left blank.

# **EXECUTIVE SUMMARY**

2 The United States (U.S.) Army Corps of Engineers (USACE) and local sponsor Commonwealth of the Northern Mariana Islands (CNMI) Coastal Resources 3 4 Management Office (CRMO) are proposing to restore the aquatic ecosystem of Saipan Lagoon. Urban runoff from upland areas over the years has led to degradation of the 5 lagoon's marine ecosystems. The Proposed Action is to construct a detention basin to 6 7 capture sediment, nutrients, and contaminants in runoff waters on Saipan for purposes of 8 restoring the lagoon's aquatic ecosystem. Improvement in the lagoon water quality is 9 needed in order to maintain the ecological health and function of the lagoon which is a vital cultural, recreational and economic resource for Saipan. Stormwater capture and 10 11 filtration through environmentally sound engineering means is necessary to address the 12 need to improve the natural ecology of Saipan Lagoon. This project is authorized under

- of the Water Resources Development Act (WRDA).
- 15 This Environmental Assessment (EA) prepared in accordance with the National

the Continuing Authorities Program (CAP) section 206-Aquatic Ecosystem Restoration

- 16 Environmental Policy Act (NEPA) of 1969 as amended, examined the No Action and
- 17 Preferred ("Build") Alternative. Under NEPA the purpose of an EA is to evaluate
- whether an action may result in a significant environmental impact. Because an
- 19 engineering solution is needed to address the lagoon's water quality and ecosystem
- degradation, the No Action scenario is not acceptable as it does not meet the project's
- 21 purpose and need. An Ecosystem Restoration Report (ERR) (Environet, 2013) prepared
- 22 concurrently with this report focuses on field studies, alternatives analysis and an
- 23 incremental cost analysis of the numerous alternatives evaluated to recommend a
- 24 Preferred Alternative that would best restore the lagoon to a less degraded, more natural
- 25 condition.

1

- 26 The Draft EA examined the following environmental impact categories: Geology and
- 27 Soils; Solid and Hazardous Waste; Noise; Climate and Air Quality; Hydrology and Water
- 28 Quality; Traffic and Circulation; Biological (Fish, Wildlife and Plants) Resources;
- 29 Historical and Cultural Resources; Land Use; Visual Resources; Recreation/Resource
- 30 Use; Economic and Social Resources and Cumulative Impacts.
- 31 Project related construction activities may result in significant short-term environmental
- 32 impacts which could be mitigated to less than significant. Fugitive dust and noise
- 33 generated by construction equipment such as backhoes, jack hammers, and large trucks
- will be mitigated by best management practices (BMPs) such as use of dust screens, site
- 35 watering, and proper maintenance of contractor equipment. Beneficial long term
- 36 environmental impacts expected are improved water quality and resultant restoration of
- 37 Saipan Lagoon's health and ecosystem function.
- 38 As described in the Draft EA, the Preferred Alternative and No Action alternative were
- analyzed to determine the potential impacts and appropriate mitigation measures for
- 40 those impacts. Thus, based on the evaluation conducted, the USACE has determined that
- 41 a Finding of No Significant Impact (FONSI) is anticipated.

This page is intentionally left blank.

# 1 LIST OF ACRONYMS

2	%	percent
3	APC	Area of Particular Concern
4	BMP	best management practice
5	CAA	Clean Air Act
6	CE	cost effectiveness
7	CEQ	Council on Environmental Quality
8	CFR	Code of Federal Regulations
9	CNMI	Commonwealth of the Northern Mariana Islands
10	CRMO	CNMI Coastal Resources Management Office
11	CWA	Clean Water Act
12	CZM	Coastal Zone Management
13	CZMA	Coastal Zone Management Act
14	dBA	decibels
15	DEQ	CNMI Division of Environmental Quality
16	DFW	CNMI Division of Fish and Wildlife
17	DNL	day-night sound level
18	DO	dissolved oxygen
19	DPW	CNMI Department of Public Works
20	DLNR	CNMI Department of Natural Resources
21	EA	Environmental Assessment
22	ER	Engineer Report
23	EIS	Environmental Impact Statement
24	EO	Executive Order
25	EPA	United States Environmental Protection Agency
26	ERR	Draft Ecosystem Restoration Report
27	ESA	Endangered Species Act
28	FONSI	Finding of No Significant Impact
29	GHG	greenhouse gas
30	HPO	CNMI Historic Preservation Office
31	ICA	incremental cost analysis
32	LEDPA	least environmentally damaging practicable alternative
33	LGHU	lagoon habitat unit
34	MMPA	Marine Mammal Protection Act
35	MMT	CNMI Marine Monitoring Team
36	NAAQS	National Ambient Air Quality Standards
37	NEPA	National Environmental Protection Act
38	NHPA	National Historic Preservation Act
39	NMFS	National Marine Fisheries Service
40	NOAA	United States National Oceanic and Atmospheric Administration
41	OSHA	United States Occupational Safety and Health Administration
42	PCA	potentially contaminating activities
43	RCRA	Resource Conservation and Recovery Act
44	SDWA	Safe Drinking Water Act
45	SSO	sanitary sewer overflows
46	SWAP	Source Water Assessment Program

1	TMDL	total maximum daily load
2	U.S.	United States
3	USACE	United States Army Corps of Engineers
4	USACE POH	United States Army Corps of Engineers, Honolulu District
5	USD	United States Dollar
6	USFWS	United States Fish and Wildlife Service
7	WRC	Water Resources Council
8	WRDA	Water Resources Development Act

# 1. INTRODUCTION

# 2 1.1 SCOPE AND AUTHORITY

- 3 The United States (U.S.) Army Corps of Engineers (USACE) is conducting an
- 4 Environmental Assessment (EA) for the restoration of the Saipan Lagoon Aquatic
- 5 Ecosystem. The Commonwealth of the Northern Mariana Islands (CNMI) Coastal
- 6 Resources Management Office (CRMO) is the local sponsor of the Proposed Action
- 7 analyzed in this EA. This document is prepared in accordance with the National
- 8 Environmental Policy Act (NEPA) of 1969, as amended, Council on Environmental
- 9 Quality (CEQ) regulations (40 Code of Federal Regulations (CFR) 1500-1508), USACE
- Regulation 33 CFR Part 230; Procedures for Implementing NEPA, as well as the Water
- 11 Resources Development Act of 2007, to evaluate the economic and environmental
- 12 consequences of the Proposed Action.
- 13 Under NEPA the purpose of an EA is to evaluate whether or not an action may have a
- significant environmental impact. Based on the study contained in the EA, it will be
- determined whether the Proposed Action will significantly affect the environment. A
- 16 Finding of No Significant Impact (FONSI) will be issued if no adverse environmental
- impacts are anticipated. If it is determined that the Proposed Action will result in adverse
- environmental impacts, an environmental impact statement (EIS) will be prepared.
- 19 The USACE is authorized under the Continuing Authorities Program (CAP) section 206-
- 20 Aquatic Ecosystem Restoration of WRDA to provide design and construction assistance
- 21 to non-Federal interests for aquatic ecosystem restoration and protection projects that are
- 22 cost-effective and in the public interest. The USACE evaluates projects that benefit the
- environment by restoring, improving, or protecting aquatic habitat for plants, fish, and
- 24 wildlife. Projects typically involve restoration of aquatic ecosystems in rivers, lakes,
- wetlands, and lagoons.
- 26 Applicable policy governing USACE restoration projects include the Planning Guidance
- Notebook (ER 1105-2-100), Ecosystem Restoration Guidance (EP 1165-2-502 in support
- of ER 1165-2-501), Engineer Regulation 200-2-2: Procedures for Implementing NEPA,
- and the principles and guidance document approved by the Water Resources Council
- 30 (WRC) in 1983 (WRC, 1983). Ecosystem restoration purpose differs from the majority
- of USACE projects in that the goal is to reverse, at least in part, past influence of human
- 32 action. Instead of building an environment-altering structure such as a bridge or a dam,
- 33 restoration projects attempt to restore ecosystems to a close approximation of their
- 34 natural state. Ecosystem restoration reestablishes a self-maintaining state that optimally
- 35 should require little human intervention.
- 36 Additionally, the entire ecosystem is the target of transformation by restoration, as
- 37 opposed to a specific species or a single component of habitat. Ecosystem restoration
- 38 includes the entire biotic community together with its physical environment, considered
- as an integrated unit (EP 1165-2-502). Often only partial ecosystem restoration is
- 40 practical, but the parts restored are done so holistically.

- 1 According to USACE policy requirements, restoration projects should conform to the following constraints:
  - the project should restore ecosystem structure, functions and values;
  - the project should result in improved environmental quality;
    - the sum of all monetary and non-monetary benefits should exceed the sum of all monetary and non-monetary costs;
    - the measures taken to improve environmental quality should result in a more natural and self-regulating system; and
    - the measures should reestablish, to the extent possible, a close approximation of pre-existing conditions.

This EA incorporates guidance established under 40 CFR Part 230.10(a). Under these guidelines the USACE requires that the least environmentally damaging practicable alternative (LEDPA) is considered, so long as the alternative does not have other significant adverse environmental consequences. The guidance also includes the following environmental analysis:

# Alternative Analysis

- The No Action Alternative.
- The Preferred Alternative

# **Environmental Impact**

• Assess the impact of each alternative on the aquatic ecosystem and the surrounding environment overall. Compare the impact of the alternatives and identify which alternative is the LEDPA and why. Identify practicable alternatives that have no significant or easily identifiable difference in impact from the LEDPA.

# **Practicability**

- Address the practicability of the above alternatives. Practicability depends on cost, technical, and logistic factors. To be practicable, an alternative must be available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall purposes. If it is otherwise a practicable alternative, an area not presently owned by the applicant which could reasonably be obtained, utilized, expanded, or managed in order to fulfill the overall purpose of the proposed activity should be considered. Technical and logistical factors that should be considered include, but are not necessarily limited to: access, transportation needs, utilities, topography, and available construction techniques.
- Address the consequences on the applicant and the public of not implementing the project.

Mitigation

1

2

3

4

5

20

If the alternative identified as the LEDPA still has adverse impacts to the aquatic ecosystem, identify how it is proposed to further minimize those impacts and provide compensatory mitigation for any remaining unavoidable adverse impacts.

# 6 1.2 STUDY AREA LOCATION

- 7 The location of this restoration study is the Saipan Lagoon, located in Saipan, CNMI.
- 8 The study area encompasses the southern portion of the West Takpochao watershed. The
- 9 study area extends from Quartermaster Road to just past the Fishing Base in Garapan
- along the western shoreline of the island of Saipan, CNMI. The study area includes the
- entire inland watershed that contributes groundwater and surface water runoff to this
- approximately two-mile length of shoreline, as well as the adjacent offshore lagoon area
- extending out approximately 0.3 miles (Figure 1).

# 14 1.3 OVERVIEW OF THE PROPOSED ACTION

- 15 The Proposed Action involves the construction of a detention basin that would capture
- sediment, nutrients, and contaminants entrained in runoff waters before they enter the
- 17 lagoon. This would help improve the water quality of runoff waters into the lagoon,
- which in turn would help restore the degraded aquatic ecosystem structure within the
- 19 lagoon to a more natural state.

# **Alternatives Considered**

- 21 The alternatives analysis process was extensive, beginning with the overall consideration
- of three alternative detention basin sites and a variety of detention basin sizes at each site,
- to achieve the overall project goal of restoring the Saipan Lagoon aquatic ecosystem to a
- less degraded, more natural condition. Detention basins are temporary holding areas for
- stormwater that may also act as settling ponds for sediment transported by sheet flow.
- 26 The detention basins would be designed to capture first flush sediment and other
- 27 contaminants that enter the basins. The basins would include overflow systems that
- would route the water to the lagoon via pipe or drainage swale systems. Dual-purpose
- 29 type uses (soccer fields, parks, etc.) for the detention basins were originally considered,
- 30 but were found to be impractical. Three sizes of detention basin were designed and
- 31 considered for each of the three sites, corresponding to the expected influx of water
- during a two-year rainfall event, a five-year rainfall event, and a 10-year rainfall event.
- 33 The project alternatives were evaluated in terms of the cost to construct the different
- 34 detention basin sizes at each of the three sites, as well as the estimated amount of
- 35 environmental restoration that would occur in the lagoon as a result of the different
- project alternatives (Figure 2). The incremental cost analysis conducted in the Ecosystem
- Restoration Report (ERR) (Environet, 2013) concluded that the Cock Fight Arena site
- with a single two-year design basin is the most appropriate alternative, as it best meets
- 39 the purpose and need of the project by providing adequate lagoon restoration at a feasible
- 40 cost. In addition, a No Action alternative was evaluated. The three sites originally

- 1 considered for the detention basins, along with the proposed alternative basin designs at
- 2 the three sites are further described in Section 2 of this EA, and in detail in the ERR.

# 1.4 PURPOSE AND NEED

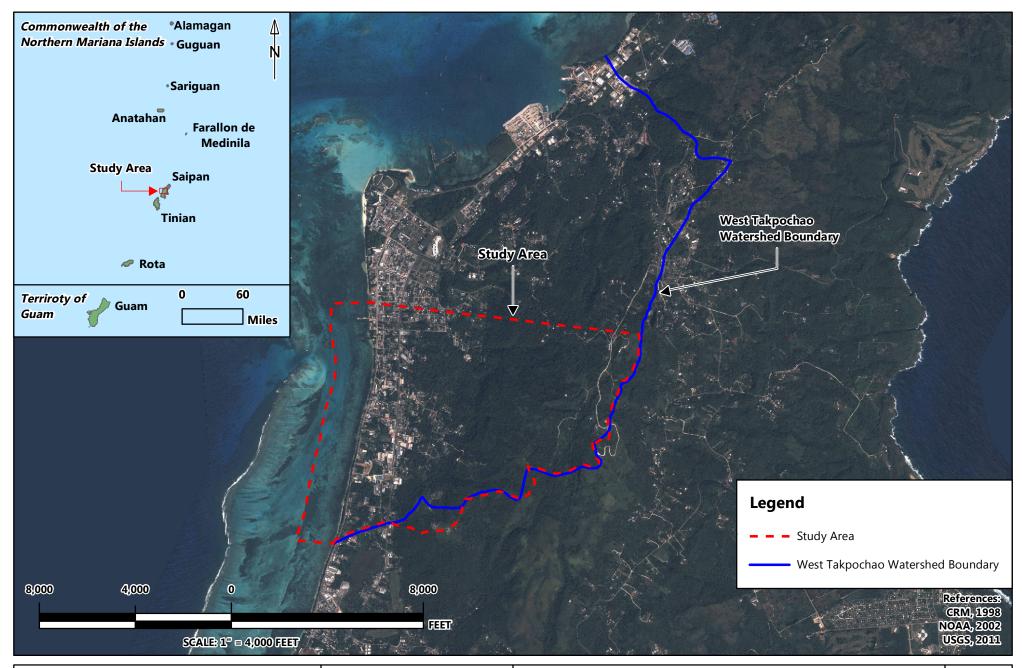
# 4 Purpose

3

- 5 The purpose of the Proposed Action is to determine an environmentally sensitive and
- 6 economically feasible means to improve the ecosystem function in the Saipan Lagoon by
- 7 reducing the amount of sediment, as well as other suspended solids that enter the lagoon
- 8 via stormwater runoff. A reduction of these constituents within the lagoon would help to
- 9 improve lagoon water quality, leading to an improvement of the degraded lagoon
- 10 ecosystem structure and function.
- 11 Indicators of this degradation include increased frequency of water quality standard
- 12 violations in near-shore recreational waters, changes in density, distribution and
- composition of sea grass communities in near-shore waters, high abundance of seasonal
- macro-algal growth, decrease in near-shore lagoon fish and degraded lagoon coral health.
- 15 The Proposed Action would provide the most appropriate environmental engineering
- solution to address the ongoing degradation of the water quality in the lagoon due to
- 17 unmitigated stormwater runoff. The Proposed Action would help meet the CNMI's
- interest in restoring the Saipan Lagoon's natural ecosystem function through capture of
- sediment and suspended solids in stormwater before entering coastal waters.

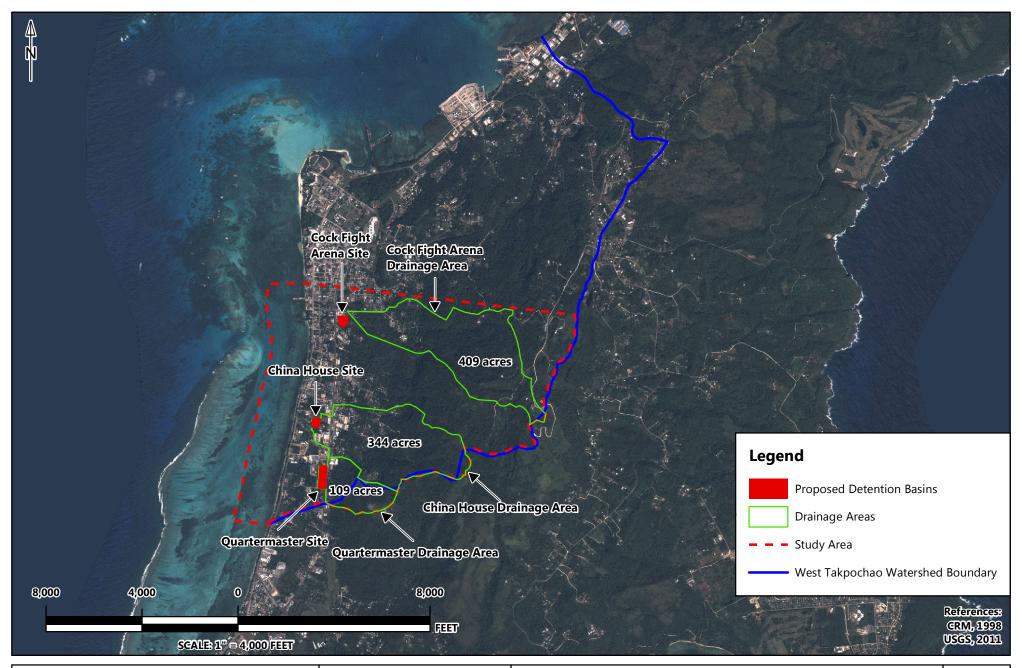
# 20 Need

- 21 A combination of increasing population and urbanization of the West Takpochao
- watershed over the past 70 years has led to degradation of the aquatic ecosystem that
- 23 makes up the Saipan Lagoon.
- 24 Degradation of ecosystem function in the Saipan Lagoon is a concern not only because of
- 25 the deterioration of natural resources supported by the lagoon, but also because
- degradation has progressed to the point that the aesthetic and recreational utility of the
- 27 lagoon has been adversely impacted. This is of substantial concern on Saipan because
- 28 the lagoon is a vital component of the tourism industry that accounts for the majority of
- 29 the local economy. Indicators of water quality degradation have been investigated and
- 30 presented in this EA and the ERR (Environet, 2013). These indicators will be discussed
- 31 briefly in the following sections, together with the desired outcomes of the future
- 32 restoration activity, and the best possible restoration alternative for the study area.





PROJECT NO.: 1057	ENVIRONMENTAL ASSESSMENT	
DATE: APRIL, 2013	SAIPAN LAGOON AQUATIC ECOSYSTEM RESTORATION STUDY	FIGURE
DRAWN BY: CB	GENERAL STUDY AREA	1
REVIEWED BY: MA	SAIPAN, CNMI	



-SEnvironet, Inc	•
------------------	---

PROJECT NO.: 1057	ENVIRONMENTAL ASSESSMENT	
DATE: APRIL, 2013	SAIPAN LAGOON AQUATIC ECOSYSTEM RESTORATION STUDY	FIGURE
DRAWN BY: CB	PROPOSED DETENTION BASINS AND DRAINAGE AREAS	2
REVIEWED BY: MA	SAIPAN, CNMI	

#### 1.4.1 Sedimentation

- 2 Sedimentation is recognized as one of the most significant problems facing the Saipan
- 3 Lagoon and is a direct result of the urban development that has taken place within the
- 4 West Takpochao watershed. Reduction of the sediment load transported to the lagoon
- 5 would significantly improve the overall function of the aquatic ecosystem.
- 6 Sediment transport to lowland areas occurs naturally in Saipan. In the study area, the
- 7 amount of sediments being transported to the lagoon environment has increased in
- 8 conjunction with the spreading urbanization of the lowland areas within the watershed.
- 9 The increased number of roofs, roads, and other paved areas impervious to rain increases
- 10 the amount of runoff and tends to channel the runoff between properties. Construction
- 11 activities and clearing of the natural vegetation tend to disturb the natural soils rendering
- 12 them more susceptible to erosion. A decline in coverage by natural vegetation due to
- increased urbanization also limits the ability of the substrate to hold rainfall and makes
- these remaining lands more subject to runoff and erosion. The resulting increased levels
- of runoff and sedimentation to the lagoon overloads the ability of the natural seagrass
- 16 community to cope with these pollutants and can damage coral reefs and associated
- 17 ecosystems.
- Damage to coral reef ecosystems can result from direct sedimentation onto coral polyps
- or from increased nutrient concentrations that may lead to overgrowth by algae species.
- 20 A shift in reef species towards more nutrient tolerant and less diverse communities will
- 21 also lead to changes in the fish populations inhabiting the reef. In addition, less diverse
- 22 communities of coral are more susceptible to damage during natural disasters such as
- 23 typhoons. Further, any perceived decrease in the quality of the coral reef ecosystem is
- 24 likely to have adverse impacts on the Saipan tourism economy.
- 25 The Soil Conservation Service estimated erosion rates for Saipan soils present in the
- 26 Kagman Watershed on the eastern side of the island. The average erosion rate from the
- 27 forested upper watershed is estimated to be about three tons per acre per year while areas
- 28 under construction may exceed rates of 20 tons per acre per year. The developed
- 29 homestead area in Kagman, which is situated on a relatively flat limestone plateau, yields
- 30 between two to five tons of soil per acre per year.
- 31 Erosion rates for the soils present within the study area are not available. However,
- 32 initial observations made during the reconnaissance field visit of eroded gravel roads,
- 33 obvious sedimentation in storm drain gullies, and occasional lapses in implementation of
- 34 best management practice (BMP) regulations at construction sites suggest that erosion
- 35 rates may be high. An attempt to evaluate sedimentation rates within the study area was
- undertaken by studying deltaic deposits along the shoreline. Three sediment deltas were
- 37 surveyed five times at three different points from 2001 to 2002 during the wet and dry
- seasons in an effort to quantify sediment load entering the lagoon via stormwater runoff.
- The change in sediment delta volume throughout the study interval was notable. The
- 40 volume of sediment at each survey point fluctuated during the study. The total volume of
- sediment lost from the three deltas during the study interval was 478 cubic yards. This
- 42 sediment likely washed into the lagoon. Results of this study are discussed in detail in
- 43 the ERR (Environet, 2013).

### 1.4.2 Water Quality

- 2 Saipan has unique water issues that offer challenges to regulatory agencies such as the
- 3 CNMI Division of Environmental Quality (DEQ) and the CRMO. Finite freshwater
- 4 sources and impacts of urban development on surrounding marine environments are of
- 5 constant concern on an island such as Saipan. This section summarizes general water
- 6 characteristics on Saipan according to the CNMI DEQ Integrated 305(b) and 303(d)
- Water Quality Assessment Report, dated November, 2010.

#### 8 Groundwater

1

- 9 Two types of aguifers are dominant on Saipan; isolated limestone aguifers, as well as the
- more prevalent basal aquifer, which is the predominant source of freshwater on the
- 11 island. Due to the limited freshwater sources, the location and distribution of these
- aguifers is of extreme importance in the CNMI. Urban growth and an increase in
- population have led to several issues that threaten the freshwater aquifers. Increasing
- demand of freshwater has led to over-pumping of the basal lens aquifer, causing high
- 15 chloride levels due to saltwater intrusion.
- 16 Although most occurrences of groundwater contamination in Saipan have not been linked
- with a specific identifiable source, the highly suspected sources, in addition to saltwater
- intrusion, include the following:
- petroleum compounds from underground storage tanks;
- pesticides, halogenated solvents, petroleum compounds, nitrate, metals, bacteria, protozoa, and viruses from disposal activities at landfills;
- nitrate, bacteria, protozoa, and viruses from septic tanks as well as pipelines and sewer lines; and
  - halogenated solvents, petroleum compounds, and metals from small-scale manufacturing and repair shops.
- Point source and nonpoint source pollution due to heavy urbanization can also threaten ground water sources through infiltration of the study area's highly permeable top soils.

#### Surface Water

24

25

- 29 The CNMI has designated two classes of water (AA and A) for marine uses. Class AA
- represents high-quality waters that are considered to be in a "natural" and "pristine" state.
- 31 The CNMI Water Quality Standards states that "to the extent practicable, the wilderness
- 32 character of such areas shall be protected," and does not permit any discharge of
- 33 pollutants in class AA waters. Class A waters have been designated in two parts of
- 34 Saipan, and generally represent a slightly lower quality of water in which some
- discharges may be permitted, for example, the two sewage treatment plant outfalls on
- 36 Saipan. Nevertheless, Class A waters must support recreational use and the propagation
- of fish, shellfish, and wildlife, and strict water quality standards have been set for the
- 38 protection of these uses in Class A marine waters. Additionally, further protection is
- 39 afforded through the CNMI Anti-Degradation Policy, which is part of the Water Quality

- 1 Standards and protects existing uses and water quality in any waters, despite their
- 2 classification.
- 3 The majority of the coastal marine waters on Saipan are designated as Class AA,
- 4 including the study area. These waters should remain in their natural pristine state as
- 5 nearly as possible with an absolute minimum of pollution or alteration of water quality
- 6 from any human-related sources or actions. The uses protected in these waters are the
- 7 support and propagation of shellfish and other marine life, as well as the conservation of
- 8 coral reefs and wilderness areas, oceanographic research, and aesthetic enjoyment and
- 9 compatible recreation inclusive of whole body contact (e.g., swimming and snorkeling)
- and related activities.
- Both point and non point source pollution are responsible for lowering the quality of the
- 12 CNMI's surface waters. Sewage out-falls, sewer collection overflows, sedimentation
- 13 from unpaved roads and development, urban runoff, reverse osmosis discharges from
- 14 hotel treatment systems, and nutrients from agricultural areas and golf courses are the
- most significant contributors to the degradation of the CNMI's surface and marine water
- quality. Surface water quality is difficult to measure and properly assess due to the many
- variables that affect surface water, including rainfall events, tidal fluctuations, and other
- 18 atmospheric and oceanographic conditions.
- 19 The CNMI Marine Monitoring Team (MMT) was initially established in 1997 to aid in
- 20 understanding the current conditions of coral reefs and coral reef resources in the CNMI.
- 21 The MMT consists of members from the CMI DEQ, CRMO, and the CNMI Division of
- 22 Fish and Wildlife (DFW). It is the goal of the MMT to continue this long-term
- 23 monitoring program to continually assess reefs and aquatic resources of the CNMI.
- According to the CNMI MMT, in order to properly and accurately assess water quality, it
- 25 is best to couple both marine habitat health data with water quality measurements.
- 26 Decreased water quality threatens marine environments because coral reefs and other
- 27 marine systems rely on good water quality for proper function and prosperity.
- Monitoring and measuring water quality and the health of aquatic ecosystems is the most
- 29 efficient way to determine marine water quality.

#### 30 1.5 REGULATORY FRAMEWORK

- 31 In addressing environmental considerations, USACE is guided by several relevant
- 32 statutes and Executive Orders (EO) that establish standards and provide guidance on
- environmental and natural resource management and planning. These statutes and EO
- 34 include, but are not limited to, the Rivers and Harbors Act, the Coastal Zone
- 35 Management Act (CZMA), the Endangered Species Act (ESA), the Fish and Wildlife
- 36 Coordination Act, the Magnuson-Stevens Fishery Conservation and Management Act,
- 37 the National Historic Preservation Act (NHPA), the Resource Conservation and
- 38 Recovery Act (RCRA), EO 13089 (Protection of Coral Reefs), EO 12898 (Federal
- 39 Actions to Address Environmental Justice in Minority Populations and Low-Income
- 40 Populations), and EO 13045 (Protection of Children from Environmental Health Risks
- and Safety Risks). Key provisions of these statutes and EOs are discussed throughout
- subsequent sections of the EA, and in detail in Section 4 of this EA.

#### 1 1.6 PUBLIC INVOLVEMENT AND AGENCY CONSULTATION

- 2 Public participation is organized in the form of public posting (newspaper bulletins and
- 3 other accessible public media) and agency consultations.

# 4 1.6.1 Agency Scoping Meetings

- 5 A series of small meetings were held with different departments of the Saipan
- 6 Government from February to August 2002. A brief summary of attendees and topics of
- 7 discussion are contained in Appendix E. Another series of meetings were held with
- 8 several CNMI and U.S. federal governmental agencies in October, 2011. Representatives
- 9 from the following government agencies were briefed and consulted during the meetings:
- 10 CNMI CRMO
- CNMI DPW
- CNMI DEQ
- CNMI Department of Public Lands
- U.S. National Oceanic and Atmospheric Administration (NOAA)

### 15 **1.6.2** Legislative Meetings

- 16 Two meetings were conducted with the Saipan Legislature from June through August of
- 17 2002. The first meeting was held on June 27, 2002 to introduce the study to the local
- authorities and the local newspaper. The second meeting was held on August 15, 2002,
- 19 to brief legislators on the progress of the EA and to discuss issues on acquiring private
- 20 land for the proposed project. A third meeting was conducted with the CNMI Legislature
- 21 on October 25, 2011 in order to provide a study update and to consult the CNMI
- Legislative representatives. Another meeting with the project team and the Governor was
- 23 held at the Legislature on October 26, 2011 in order to provide updated study information
- and consult the Governor.

# 25 **1.6.3 Public Meetings**

- 26 Two articles were printed in the local newspapers on June 29 and July 1st of 2002. An
- 27 updated public scoping period will be initiated following publication of the Draft EA,
- 28 including a study update and call for public comments via the local newspaper.
- 29 Interested members of the public will be able to comment on the draft document and have
- their comments taken into consideration during preparation of the Final EA.

#### 1 2. DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

- This section describes the alternatives, including the Preferred Alternative, that were developed to meet the following objectives:
  - Select an environmentally sensitive and economically feasible alternative that would restore the Saipan Lagoon aquatic ecosystem to be self-sustaining in its ecologically modified environment, by examining a range of alternative basin locations and sizes in the West Takpochao watershed. Evaluation criteria used include the amount of freshwater the basin could hold (capacity), the percent of the watershed that would drain into the basin, and the relative amount of sediment, hazardous runoff, and runoff loading the basin would receive compared to the amount produced within the study area, as well as the associated construction costs;
  - Construct the selected detention basin facility that meets the engineering and cost considerations;
    - Restore the lagoon environment to a more natural state following construction of the proposed detention basin(s).

# 2.1 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

- The following alternatives were considered during the initial alternative formulation process:
- 21 No Action

4

5

6 7

8

9

10

11 12

13

14

15

16

- Capturing and pumping contaminants offshore
- Erosion control
- Detention basins
- 25 The no action alternative was considered to be unresponsive to the needs of the local
- 26 sponsor and was eliminated from further evaluation. The no action alternative was,
- 27 however, included in the alternatives analysis in the ICA (concurrently being prepared
- with this report) as well as the EA as required by the Council of Environmental Quality
- 29 (CEQ) regulation 40 Code of Federal Regulations (CFR) Section 1502.14(d). Capturing
- 30 and pumping contaminants offshore was eliminated from further evaluation because
- 31 CNMI stated that they cannot afford to maintain the mechanical pumps. Erosion control
- within the upper portion of the watershed was considered but not carried forward for
- of the difference of the water that the control of the control of
- further evaluation since it was not considered to be sufficient in addressing the purpose
- 34 and need of the project. Construction of detention basins was considered the most cost
- 35 effective and efficient in addressing the purpose and need of the project; therefore, was
- 36 carried forward for further evaluation.
- 37 Three alternative detention basin sites (China House, Quartermaster, and Cock Fight
- 38 Arena), that are located in low-lying areas within the West Takpochao watershed, were
- 39 considered to achieve the overall project goal and evaluated in terms of the amount of

- 1 freshwater they could hold (capacity), the percent of the watershed that would drain into
- 2 the basin, and the relative amount of sediment, hazardous runoff, and runoff loading they
- 3 would receive compared to the amount produced within the entire study area. Three sizes
- 4 of detention basins were designed for each of the three sites, corresponding to the
- 5 expected influx of water during a two-year, five-year, and 10-year rainfall event. Each
- 6 detention basin was characterized in terms of its cost and expected benefits using the cost
- 7 effectiveness (CE)/incremental cost analysis (ICA) program.
- 8 Since the three sites currently flood during heavy rains, all three were determined to be
- 9 effective in receiving runoff waters and functioning as detention basin sites. Three storm
- events were evaluated, including two-year, five-year, and 10-year recurrence storms (all
- one-hour duration events). The watershed analysis for each storm event and site is
- included in the Preliminary Drainage Design for Aquatic Ecosystem Restoration Study,
- 13 Saipan Lagoon, Saipan, Northern Mariana Islands (Community Planning & Engineering,
- 14 Inc., 2012). This report is included as Appendix A.
- 15 The CE/ICA program developed by the USACE Institute for Water Resources was used
- 16 to conduct a CE/ICA for the different alternative sites and design combinations.
- 17 Economic analysis for environmental planning consists of two analytical processes that
- together form the CE/ICA. CE analysis identifies the least-cost alternative for each level
- of environmental output. Following the CE analysis, an ICA was performed to show the
- 20 incremental change in cost with increasing levels of environmental output. Including the
- 21 No Action alternative, 19 cost effective least-cost combinations of the three detention
- basin sites were subjected to an ICA in which only four combinations were retained for
- 23 the final incremental analysis (Environet, 2013). Each alternative consists of a different
- 24 combination of detention basins to be constructed in the West Takpochao watershed.
- 25 The dollar cost of each alternative, along with the lagoon habitat units (LGHUs) restored
- 26 for each alternative were key factors in evaluating the feasibility and effectiveness of
- each alternative considered for analysis. The LGHUs represent the equivalent acres of
- 28 lagoon area restored by implementing the chosen detention basin design combinations for
- 29 each alternative. The LGHUs are a derived variable based on acres of lagoon habitat
- 30 restored by reducing sediment, and contaminant runoff from potentially contaminating
- activities (PCAs). A PCA is defined as a facility or activity that 1) stores, transmits, uses,
- or produces contaminants, chemicals or by-products; and 2) has the potential to release
- contaminants that may impact the quality of the lagoon water (Environet, 2013).

#### **Alternative Sites Considered**

35 China House Site

- 36 The proposed China House site is located in the mid-southern portion of the study area
- 37 about halfway between Middle and Beach Roads, across from the Pizza Hut building and
- 38 Beach Road, near the China House restaurant (Figure 2). Topographically, the Site is
- 39 characterized by a natural drainage channel that flows to an outfall located along Beach
- 40 Road in the center of the proposed Site. The remaining Site area is predominantly flat to
- 41 slightly sloping toward Beach Road and the lagoon.

- 1 The Site currently serves as a natural drainage area for surface water from Middle Road
- 2 and the upper parts of the Gualo Rai area. Surface water reaches the lagoon through this
- 3 area via surface sheet flow and through the natural swale. There is currently a storm
- 4 water catch basin located along Middle Road adjacent to Pizza Hut that collects surface
- 5 water and diverts it beneath Middle Road and into the proposed detention basin Site.
- 6 During medium to large storm events, the catch basin is insufficient to handle the volume
- 7 of runoff and severe flooding occurs along Middle Road at the Pizza Hut location. The
- topographic nature of this site is conducive to the construction of a detention basin. 8

#### 9 Quartermaster Site

- 10 The proposed Quartermaster Site is located at the southern-most end of the study area, at
- 11 the intersection of Quartermaster Road to the south and Middle Road to the east
- 12 (Figure 2). The Site is currently vacant and overgrown, and generally slopes to the
- 13 southwest. Several commercial and residential buildings lie adjacent to the proposed
- 14 Site.
- 15 Quartermaster Road, together with adjacent swales, serves as a major drainage route for
- 16 surface water during rain events. A drainage culvert is located beneath Middle Road at
- 17 the intersection of Middle and Quartermaster Roads. The contributory area to surface
- 18 runoff in this area includes Middle Road and areas in the southern portion of the West
- 19 Takpochao watershed.
- 20 This area would be used in a similar manner as the China House site; a detention basin
- 21 that would act as a settling pond for sediment and contaminants prior to discharging
- 22 surface water to the lagoon.

#### 23 Cock Fight Arena Site

- 24 The proposed Cock Fight Arena Site is located on the east side of Middle Road at the
- 25 northern end of the study area (Figure 2). The closest cross street is Commonwealth
- 26 Road, located approximately 200 feet north of the Cock Fight Arena Site. This Site is
- 27 characterized by an abandoned quarry pit that occupies roughly one third of the Site, in
- 28 the southeastern corner. The depression of the pit extends approximately ten feet in
- 29 depth at its deepest point. The remaining portion of the Site is predominantly flat to
- 30 slightly sloping in the direction of the quarry depression. The Arena is currently located
- 31 on the western side of the Site. Commonwealth Road acts as a major channel for surface
- 32 runoff water from a large contributory area during medium to large flood events. During
- 33 rain events, surface water streams down Commonwealth Road and into storm drains
- 34 located at the intersection of Commonwealth and Middle Roads. The storm drain diverts
- 35 the water north toward Garapan and into a large surface water outfall that enters the
- 36
- lagoon near the Dai Ichi Hotel. The area of restoration for this alternative thus may
- 37 extend north of the study area indicated on Figure 2. The contributory area for surface
- 38 flow in this area includes many unpaved areas in the upper reaches of the watershed,
- 39 leading to large amounts of sediment transport from the upper reaches of the watershed to
- 40 the lagoon. During medium to large rain events, the current storm drain is insufficient to
- 41 handle the amount of flow that occurs, resulting in severe flooding at the intersection of
- 42 Commonwealth and Middle Road and the surrounding areas.

September 2013

#### **Alternative Basin Sizes Considered**

2 The numbering sequence for all combinations of alternatives follows the following format:

- Prefix C, Q, or A refers to the China House (C), Quartermaster (Q), or Arena site (A).
- Numeral 0, 1, 2, or 3 refers to the no action (0), two-year (1), five-year (2), or 10-year (3) design level, respectively. Thus C2 is the China House five-year design while Q0 refers to the Quartermaster no action alternative.

Based on the assumptions that any or all of the three sites could be developed concurrently at the no-build, two-year, five-year, or 10-year design level, there were 64 different plan combinations. After conceiving all possible plan combinations, inefficient combinations were eliminated by identifying combinations with identical levels of output and eliminating the one with the higher cost. This process resulted in the identification of 48 least-cost combinations.

The 48 least-cost combinations were then analyzed for CE by identifying and eliminating the combinations that produce a lower level of output for the same or greater cost than another combination. This CE analysis resulted in a set of 18 cost-effective combinations. The 18 cost-effective combinations were then subjected to a preliminary ICA in which combinations with the lowest incremental cost per output for a particular output level was identified. Seven best buy plans (i.e., the plan combinations with the lowest incremental cost per output level) were retained as a result of this preliminary ICA analysis.

Of the seven best buy plans, three combinations with the highest incremental cost were eliminated from further evaluation because the significantly higher cost of these three combinations were not justified by a significant increase in output. In addition, the no action combination, which was considered to be unresponsive to the needs of the local sponsor, was eliminated from further evaluation. Once the final three combinations were identified, they were subjected to an Abbreviated Cost and Schedule Risk Analysis, in which the contingencies were calculated for each alternative. Once the contingencies were calculated, they were placed in the Total Project Cost Summary to determine the total project cost for each alternative. The final ICA was performed on the three combinations using the total project cost instead of the estimated costs that were used for the preliminary ICA. Table 1 summarizes the findings of this alternatives analysis phase.

1

**Table 1: Summary of Possible Alternative Development Scenarios** 

ALTERNATIVE	Project	Size(s) of Detention	Comment
	Location(s)	Basin(s)/Storage Capacity	
No Action	none	none	No restoration of lagoon's natural state; continued environmental impact. Does not meet purpose and need.
Preferred Alternative (C0Q0A1)	Cock Fight Arena	two-yr design basin/11.85 ac-ft	Beneficial impact on the aquatic ecosystem of the lagoon at a feasible cost. Meets purpose and need.
Alternative 3 (C2Q0A1)	China House Cock Fight Arena	five-yr design basin/13.54 ac-ft two-yr design basin/11.85 ac-ft	Beneficial impact on two regions of the lagoon; developmental costs three times higher than the Preferred Alternative. Increase in cost not justified by level of output.
Alternative 4 (C2Q2A1)	China House Quartermaster Cock Fight Arena	five-yr design basin/13.54 ac-ft five-yr design basin/4.885 ac-ft two -yr design basin/11.85 ac-ft	Beneficial impact on three regions of the lagoon; much greater cost not justified by level of output. Therefore eliminated from further analysis.
Alternative 5 (C2Q3A1)	China House Quartermaster Cock Fight Arena	five-yr design basin/13.54 ac-ft ten-yr design basin/6.92 ac-ft two -yr design basin/11.85 ac-ft	Significantly higher costs not justified by significant increase in output. Therefore eliminated from further analysis.
Alternative 6 (C3Q3A1)	China House Quartermaster Cock Fight Arena	10-yr design basin/15.84 ac-ft 10-yr design basin/6.92 ac-ft 2-yr design basin/11.85 ac-ft	Significantly higher development costs not justified by significant increase in output. Therefore eliminated from further analysis.
Alternative 7 (C3Q3A3)	China House Quartermaster Cock Fight Arena	10-yr design basin/15.84 ac-ft 10-yr design basin/6.92 ac-ft 10-yr design basin/14.23 ac-ft	Significantly higher development costs not justified by significant increase in output. Therefore eliminated from further analysis.

2

4

5

6 7

8

As a result of the final ICA, one combination with the highest output but with the highest incremental cost was eliminated from further evaluation considering the relatively high cost per output that was not matched by its level of output. The remaining two combinations (C0 Q0 A1 and C2 Q0 A1) were retained for further evaluation and underwent a review of their potential benefits and costs. Table 2 summarizes the findings and rankings of the ICE.

September 2013

**Table 2: Final Incremental Cost Analysis** 

Combination	Average Annual Cost	Average Annual LGHUs (equivalent acres)	Average Annual Cost per LGHU	Incremental Annual Cost	Incremental Annual Output (equivalent acres)	Annual Incremental Cost per Output
C0 Q0 A1	\$300,375	4.22	\$71,182	\$300,375	4.22	\$71.18
C2 Q0 A1	\$458,532	8.82	\$51,991	\$158,157	4.60	\$34.38

- 2 Of the two combinations retained following the final ICA, it was determined that the
- 3 second alternative (C2 Q0 A1) was unaffordable, and as a result, the first alternative (C0
- 4 Q0 A1) was selected as the Preferred Alternative by the project sponsor (the CNMI
- 5 CRMO). A detailed analysis of costs associated with the alternatives can be found in the
- 6 ERR (Environet, 2013).

1

# 7 The Least Environmentally Damaging Practicable Alternative (LEDPA) Analysis

- 8 The project alternatives were analyzed to identify the LEDPA in accordance with 40 CFR
- 9 Part 230.10(a). Under these guidelines the USACE requires that the LEDPA is
- 10 considered for implementation as the Preferred Alternative.
- Alternatives five through seven would all offer adequate potential ecosystem restoration
- through improved water quality within the lagoon. However, these alternatives would
- require the commitment of costs that would not be practical to implement, given the
- projected output of environmental restoration for these alternatives. Therefore, one two-
- 15 year detention basin at the Cock Fight Arena site was chosen as the LEDPA, given its
- projected restoration area and feasible project cost (Table 1).

#### 17 2.2 PREFERRED ALTERNATIVE

- 18 The Preferred Alternative is the design and construction of a two-year detention basin at
- 19 the Cock Fight Arena Site (Figure 3). This scenario results in 70.33 LGHUs of total
- 20 restoration area in a distinct area of the lagoon. The total project cost of the Preferred
- 21 Alternative is estimated at 7.896 million dollars. A preliminary design of the required
- 22 improvements was completed for the Preferred Alternative.
- 23 Preliminary designs are discussed in greater detail in the Preliminary Drainage Design
- 24 Study (Appendix A). Local residents have indicated that during heavy rains, large
- amounts of sediment are washed away from sloped areas and deposited downstream.
- 26 Many roads and driveways are not paved and are severely damaged during moderate to
- 27 heavy rainfall events. It is anticipated from this information that large amounts of
- sediment may be deposited in the detention basins. For each detention basin design, the
- 29 outlet pipe is proposed to be wrapped in filter cloth and gravel, and to be located one to
- 30 three feet above the bottom of the detention basin. This will allow for sediment to settle
- 31 out in the basin and will require periodic removal of sediment from the basins.

#### 2.3 NO ACTION ALTERNATIVE

2 CEQ regulation 40 CFR Section 1502.14(d) requires an alternatives analysis to include the alternative of no action. Therefore, the No Action alternative will be analyzed in this 3 4 EA. The No Action alternative calls for no change to the existing infrastructure. No 5 detention basin will be constructed at any site and stormwater runoff will continue to 6 flow directly into the lagoon. The No Action alternative is presented in the EA in order to analyze the environmental conditions that would occur if the proposed detention basins 7 8 are not implemented within the study area. It also serves as the baseline for comparative 9 analysis of impacts.

Table 3 summarizes total project costs, benefits and environmental acceptability of the Preferred Alternative detention basin design versus the No Action Alternative. A detailed description and breakdown of the total project cost associated with the Preferred Alternative is included in the ERR (Environet, 2013).

1415

10

11 12

13

1

**Table 3: Summary Comparison of Alternatives** 

	No Action Alternative	Preferred Alternative (C0 Q0 A1)
Water Quality	No LGHU	Estimated to restore
Restoration	restoration	70.33 LGHUs
Environmental Acceptability	No restoration, adverse environmental impact	Beneficial impact on lagoon water quality
Required Maintenance	None	Low
Total Project Cost	\$0.00	\$8,451,000

16 17

18

19

20

21

22

23

24

25

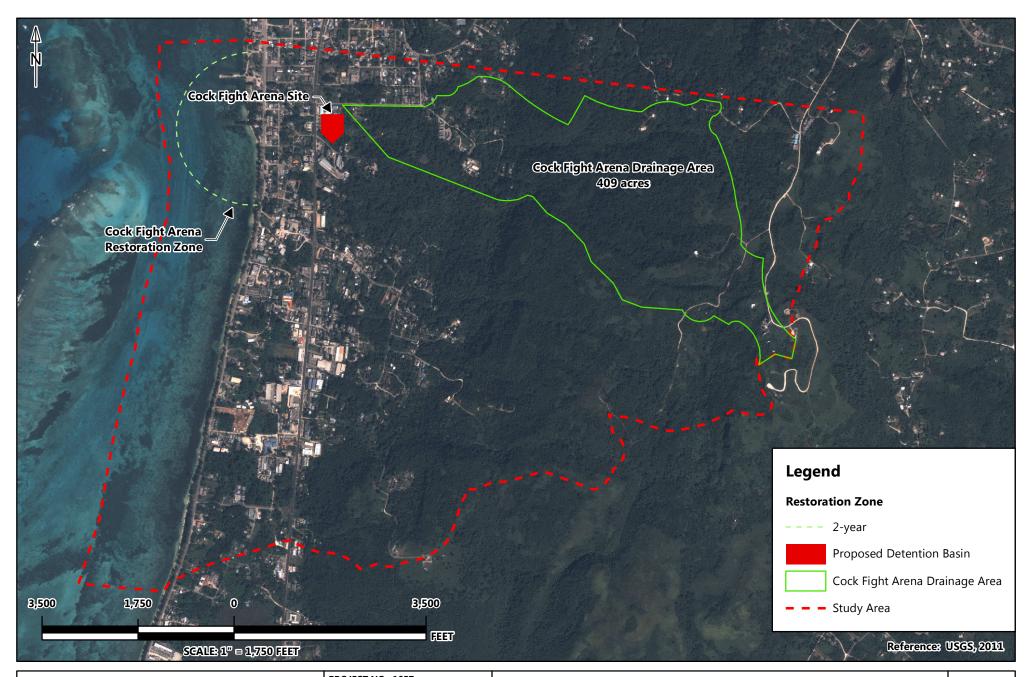
The EA is considering the Preferred Alternative and a discussion of the consequences of taking no action, and is limiting the range of alternatives to action and no action because there are no unresolved conflicts concerning alternative uses of available resources.

The primary considerations for USACE and CNMI in selection of a Preferred Alternative include the purpose and need for the project, environmental impacts of the project, and the overall costs required for development. The No Action alternative has fewer short term environmental impacts compared to the Preferred Alternative; however, the No Action alternative does not meet the purpose and need for the proposed project to allow for the restoration of the natural ecology of Saipan Lagoon.

1

September 2013

This page is intentionally left blank.



- Environet, l	Inc.
----------------	------

	PROJECT NO.: 1057	ENVIRONMENTAL ASSESSMENT	
	DATE: SEPTEMBER 20, 2012	SAIPAN LAGOON AQUATIC ECOSYSTEM RESTORATION STUDY	FIGURE
•	DRAWN BY: CB	PREFERRED ALTERNATIVE	3
	REVIEWED BY: MA	SAIPAN, CNMI	

# 3. AFFECTED ENVIRONMENT, ENVIRONMENTAL CONSEQUENCES AND MITIGATION

# **3 Environmental Impacts**

- 4 The CEQ regulations (40 CFR 1508.7 and 1508.8) define the impacts and effects that
- 5 must be addressed and considered by Federal agencies in satisfying the requirements of
- 6 the NEPA process, which includes direct, indirect and cumulative impacts.

# 7 Impacts

1

2

- 8 **Direct Impacts**: are caused by the action and occur at the same time and place.
- 9 **Indirect Impacts**: are caused by the action and are later in time or farther removed in
- distance, but are still reasonably foreseeable. Indirect impacts may include growth
- inducing impacts and other impacts related to induced changes in the pattern of land use,
- 12 population density or growth rate, and related effects on air, water and other natural
- 13 systems, including ecosystems.
- 14 Impacts include ecological (such as the effects on natural resources and on the
- 15 components, structures, and functioning of affected ecosystems), aesthetic, historical,
- 16 cultural, economic, social, or health, whether direct, indirect, or cumulative. Impacts
- may also include those resulting from actions which may have both beneficial and
- detrimental effects, even if on balance the agency believes that the effect will be
- 19 beneficial (40 CFR 1508.8).

#### 20 Significance of Environmental Impacts

- 21 According to the CEQ regulations (40 CFR 1500-1508), the determination of a
- significant impact is a function of both context and intensity.
- 23 **Context**: This means that the significance of an action must be analyzed in several
- 24 contexts such as society as a whole (human, national), the affected region, the affected
- 25 interests, and the locality. Significance varies with the setting of the Proposed Action.
- For instance, in the case of a site-specific action, significance would usually depend upon
- 27 the effects in the locale rather than in the world as a whole. Both short- and long-term
- 28 effects are relevant.
- 29 **Intensity**: This refers to the severity of impact. Responsible officials must bear in mind
- 30 that more than one agency may make decisions about partial aspects of a major action.
- 31 The following should be considered in evaluating intensity:
- 1. Impacts that may be both beneficial and adverse. A significant impact may exist even if the Federal agency believes that on balance the effect will be beneficial.
- 2. The degree to which the Proposed Action affects public health or safety.
- 3. Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

- 4. The degree to which the effects on the quality of the human environment are likely to be highly controversial.
  - 5. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.
  - 6. The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.
  - 7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.
  - 8. The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.
  - 9. The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.
  - 10. Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment (40 CFR 1508.27).
- 22 To determine significance, the severity of the impact must be examined in terms of the
- 23 type, quality and sensitivity of the resource involved; the location of the proposed project;
- 24 the duration of the effect (short or long-term) and other consideration of context.
- 25 Significance of the impact will vary with the setting of the Proposed Action and the
- surrounding area (including residential, industrial, commercial, and natural sites).

# **27 Cumulative Impacts**

- 28 Cumulative impacts are the impacts on the environment which result from the
- 29 incremental impacts of the action when added to other past, present, and reasonably
- 30 foreseeable future actions regardless of what agency (Federal or non-Federal) or person
- 31 undertakes such other actions. Cumulative impacts can result from individually minor
- 32 but collectively significant actions taking place over a period of time.

#### 33 3.1 GEOLOGY AND SOILS

#### 34 3.1.1 Existing Conditions

#### 35 Geology

- 36 The island of Saipan is composed of a volcanic core upon which a series of discrete
- 37 limestone formations have been deposited by coral reefs when these sections of the island
- were below sea level. Roughly 90 percent (%) of the surface of the island is currently
- 39 mantled with limestone, with the remaining areas chiefly comprising volcanic outcrops
- and unconsolidated beach or marsh deposits (Figure 4). The aerial distribution of rock

1

2

3

4

5 6

7

8

9

10

11

12

13

14

15

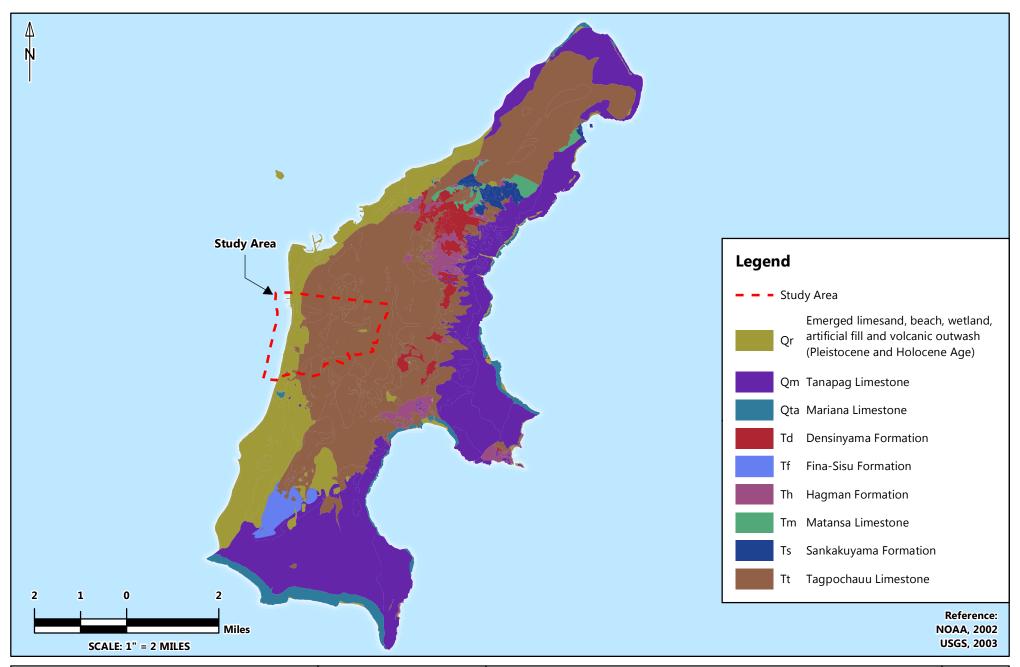
16

17

18

19

20



	PROJECT NO.: 1057	PROJECT NO.: 1057	ENVIRONMENTAL ASSESSMENT	
-OF Environet In	<u> </u>	DATE: APRIL, 2013	SAIPAN LAGOON AQUATIC ECOSYSTEM RESTORATION STUDY	FIGURE
CILIVII ONEL, III	1C. D	DRAWN BY: CB	SURFACE GEOLOGY OF SAIPAN	4
•	R	REVIEWED BY: MA	SAIPAN, CNMI	

- type on the island has been created by successive episodes of tectonic uplift resulting
- 2 from the flexure of the outer edge of the Philippine Plate in response to subduction of the
- 3 Pacific Plate to the east of Saipan along the Marianas Trench (Karig, 1971). The thick
- 4 fringing limestone units, which are exposed at elevations of up to 1,540 feet above mean
- 5 sea level on the summit of Mount Takpochao, have become sub-aerially exposed as a
- 6 result of these tectonic processes.
- 7 The study area is situated in the western central part of the island of Saipan. The area
- 8 between the shoreline and Middle Road is a slightly to moderately sloping coastal plain
- 9 composed of unconsolidated limestone derived sediments. The area inland of Middle
- 10 Road possesses the characteristic geomorphology on the island of Saipan with slightly to
- moderately sloping topographic plateaus separated by seaward-facing scarps of emergent
- 12 limestone.
- 13 The western half of the island, where the site investigation was conducted, is bordered by
- a large barrier reef and lagoon. Cloud et al. (1956) show the Garapan coastal plain to be
- underlain by recently emerged lime sands that overlie competent limestone reef at
- 16 varying depths.

#### 17 **Soils**

- 18 The characteristics of the surface soils within the study area generally vary from the
- shoreline to upland areas of the watershed. The lowland areas that extend from the
- shoreline to directly inland of Middle Road are dominated by soils of the Chinen-Urban
- Land Map Unit (Young, 1989). These soils are highly porous and account for the lack of
- 22 natural streambeds or continuous drainage ways across the lowland areas. The areas
- 23 upland of Middle Road in the vicinity of Gualo Rai are covered by soils of the Kagman-
- 24 Saipan Map Unit while further inland the land area is dominated by the Takpochao-
- 25 Chinen-Rock Outcrop Map Unit. The Chinen-Urban Land Map unit in the lowlands
- between Middle Road and the Beach Road is the soil unit most prone to erosion in the
- 27 study area. However, the largest percentage of the sedimentation that occurs along the
- 28 Beach Road drainages appears to come from quarried limestone backfill used for road
- and lot surfacing, rather than from erosion of the underlying native soils.

#### 30 3.1.2 Potential Impacts and Mitigation

#### 31 No Action

- 32 Under the No Action alternative there would be no change to geology and soils within the
- 33 study area. Soils and sediment would continue to be eroded and deposited within the
- 34 lagoon by stormwater runoff, leading to cumulative impacts to the lagoon water quality
- 35 from soil erosion.

#### 36 Preferred Alternative

- 37 The Preferred Alternative would have less than significant impacts on affected soils
- within the study area during the construction period through the institution of appropriate
- 39 soil erosion control BMPs, such as use of silt fencing. Soils would be excavated in order
- 40 to construct the detention basin. The excavated soils would be reused or trucked to the

- 1 Marpi Landfill in Saipan for disposal. No significant impacts to geology and soils are
- 2 anticipated from the Preferred Alternative.

# 3 3.2 SOLID AND HAZARDOUS WASTE

- 4 The U.S. Environmental Protection Agency (EPA), under RCRA, regulates the
- 5 generation and disposal of solid and hazardous waste, as defined in 40 CFR Part 261,
- 6 Identification and Listing of Hazardous Waste. An integral part of the aquatic ecosystem
- 7 restoration study is to identify sources that contribute nutrients or contaminants to the
- 8 lagoon. PCAs that reside within the study area were inventoried and subjected to a
- 9 susceptibility analysis. The guideline utilized in the analysis is the Source Water
- 10 Assessment Program (SWAP) that was part of the Safe Drinking Water Act (SDWA)
- amendment in 1996. The SWAP was used to assess the susceptibility of all drinking
- water sources to activities that have significant potential to release contaminants to water
- 13 sources. Although drinking water is not the primary focus of this study, the same
- principles were applied during the assessment of PCAs that affect the lagoon water.
- 15 Therefore, for the purpose of this study, a PCA is defined as a facility or activity that 1)
- stores, transmits, uses, or produces contaminants, chemicals or by-products; and 2) has
- 17 the potential to release contaminants that may impact the quality of the lagoon water.
- Results of the study on water contaminants are discussed in greater detail in the ERR
- 19 (Environet, 2013).

## 20 **3.2.1 Existing Conditions**

- 21 The areas adjacent to Beach and Middle roads contain numerous commercial, residential
- and industrial facilities that are all potential sources of pollutants to surface and ground
- 23 waters which impact the lagoon. PCAs present in this area include gas stations,
- 24 automobile dealerships, septic systems associated with various residential and
- 25 commercial properties, and sediment erosion associated with construction and unpaved
- 26 roads. Additionally, the sewer collection system within the study area along Middle Road
- 27 is known to overflow, creating contamination from sanitary sewer overflows (SSOs). An
- inventory and map of PCAs in the study area are included in the ERR (Environet, 2013).

#### 29 **3.2.2 Potential Impacts and Mitigation**

- 30 No Action
- 31 Under the No Action alternative there would be no change to the existing environment.
- 32 Potentially hazardous materials from PCAs collected in stormwater runoff would
- 33 continue to impact the affected environment.
- 34 <u>Preferred Alternative</u>
- 35 Beneficial impacts are anticipated under The Preferred Alternative. The Preferred
- 36 Alternative would utilize detention basins to trap PCA runoff water prior to its transport
- 37 to the lagoon. With proper control and treatment, the runoff water will contain less
- 38 contaminants before entering the lagoon compared to the No Action alternative. The
- 39 Preferred Alternative would have insignificant impacts within the study area during the

- 1 construction period due to the use of construction equipment utilizing petroleum
- 2 products. The institution of construction BMPs, including frequent equipment and
- 3 vehicle inspections to assure proper function, would mitigate any releases of potentially
- 4 hazardous materials or petroleum products from construction equipment into the
- 5 environment.

#### 6 **3.3 NOISE**

- 7 Determination of noise levels are based on 1) sound pressure level generated (decibels
- 8 [dBA] scale), 2) distance of listener from source of noise, 3) attenuating and propagating
- 9 effects of the medium between the source and the listener, and 4) period of exposure.

# 10 **Regulatory Setting**

- 11 The average exterior noise level generally considered acceptable for projects receiving
- federal assistance is 65 day-night sound levels (DNL). The DNL represents the 24-hour
- average sound level for day, with nighttime noise levels increased by 10 dBA. The
- 14 CNMI does not have specific established noise level standards, and utilizes U.S. federal
- 15 noise level recommendations when necessary.
- 16 The EPA has identified a range of yearly DNL standards that are sufficient to protect
- public health and welfare from the effects of environmental noise (EPA, 1977). The EPA
- has established a goal to reduce exterior environmental noise to a DNL not exceeding 65
- 19 dBA and a future goal to further reduce exterior environmental noise to a DNL not
- 20 exceeding 55 dBA. Additionally, the EPA states that these goals are not intended as
- 21 regulations as it has no authority to regulate noise levels, but rather they are intended to
- be viewed as levels below which the general population will not be at risk from any of
- be viewed as levels below which the general population will not be at risk from a
- 23 the identified effects of noise.
- 24 The U.S. Occupational Safety and Health Administration (OSHA) has established
- 25 acceptable noise levels for workers. Table 4 shows permissible noise levels for varying
- 26 exposure times.

27 Table 4: OSHA Permissible Noise Exposures

Duration per day-hours	Sound level dBA slow response
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	110
0.25 or less	115

28 Source: OSHA, 2012

The Noise Control Act of 1972 (42 U.S.C. 4901 to 4918) establishes a national policy to promote an environment for all Americans free from noise that jeopardizes their health and welfare. To accomplish this, the Act establishes a means for the coordination of Federal research and activities in noise control, authorizes the establishment of Federal noise emissions standards for products distributed in commerce, and provides information to the public respecting the noise emission and noise reduction characteristics of such products (42 U.S.C. 4901). The Act authorizes and directs that Federal agencies, to the fullest extent consistent with their authority under Federal laws administered by them, carry out the programs within their control in such a manner as to further the policy declared in 42 U.S.C. 4901.

#### 3.3.1 Existing Conditions

The study area is located along a developed transportation corridor (Middle Road). The primary existing noise sources in the study area include traffic noise from Middle Road, as well as from other smaller feeder roads in the area. Other noise sources in the area include common noises from businesses along Middle Road, as well as residences in the area.

A-weighted sound level, measured in dBA is one measurement of noise. The human ear can perceive sound over a range of frequencies, which varies for individuals. In using the A-weighted scale for measurement, only the frequencies heard by most listeners are considered. This gives a more accurate representation of the perception of noise. Using this scale, the DNL of an urban/residential area, similar to conditions within the study area, can be estimated as approximately 70 dBA. Normal conversational speech at a distance of five to ten feet is approximately 70 dBA. The decibel scale is logarithmic, so, for example, sound at 90 dBA would be perceived to be twice as loud as sound at 80 dBA. Passenger vehicles, motorcycles, and trucks use the roads in the vicinity of the study area. Noise levels generated by vehicles vary based on a number of factors including vehicle type, speed, and level of maintenance. Intensity of noise is attenuated with distance. Some estimates of noise levels from vehicles are listed in Table 5 (Cavanaugh and Tocci 1998).

**Table 5: Typical Noise Sources** 

Source	Distance (feet)	Noise Level (dBA)
Auto, 40 mph	50	72
Automobile Horn	10	95
Light Auto Traffic	100	50
Truck, 40 mph	50	84
Heavy Truck or Motorcycle	25	90

31 Source: Cavanaugh and Tocci, 1998.

### 1 3.3.2 Potential Impacts and Mitigation

# 2 No Action

- 3 Under the No Action alternative no construction activities would occur in the study area,
- 4 therefore there would be no additional impacts to existing noise receptors within the
- 5 study area.

#### 6 Preferred Alternative

- 7 The Preferred Alternative would have less than significant impacts within the study area
- 8 from temporary noise impacts from construction equipment and vehicles during the
- 9 construction period. The institution of BMPs and properly scheduled work times would
- 10 further mitigate noise impacts. There would be no long term noise impacts associated
- with the operation of the proposed detention basin.

# 12 3.4 CLIMATE AND AIR QUALITY

#### 13 **Regulatory Background**

- 14 The CNMI utilizes the National Ambient Air Quality Standards (NAAQS) regulated by
- 15 the EPA to provide established sets of ambient air quality standards to protect human
- 16 health and welfare.
- 17 CNMI Administrative Code DEQ Chapter 65-10: Air Pollution Regulations establish
- standards to insure that air resources are protected against pollution and do not constitute
- a health hazard. Section 65-10-101 of the Code states that "a permit shall be required for
- 20 the construction and operation of all new sources or modifications of major sources of
- 21 emissions" (CNMI DEQ 65-10-101, p. 8).

#### 22 Climate Change

- 23 The impact of new development on climate has been a growing concern. Greenhouse
- 24 gases (GHGs) trap heat in the earth's atmosphere. Both naturally occurring and
- anthropogenic (man-made) GHGs include water vapor, carbon dioxide, methane, nitrous
- oxide, and ozone. According to guidance from the CEQ, during an analysis of direct
- effects, it is appropriate to: (1) quantify cumulative emissions over the life of the project;
- 28 (2) discuss measures to reduce GHG emissions, including consideration of reasonable
- 29 alternatives; and (3) qualitatively discuss the link between such GHG emissions and
- 30 climate change. However, it is not currently useful for the NEPA analysis to attempt to
- 31 link specific climatological changes, or the environmental impacts thereof, to the
- 32 particular project or emissions, as such direct linkage is difficult to isolate and to
- understand. The estimated level of GHG emissions can serve as a reasonable proxy for
- 34 assessing potential climate change impacts, and provide decision makers and the public
- with useful information for a reasoned choice among alternatives (CEO, 2010).
- 36 EC 1165-2-212 seeks discussion related to how Climate Change may mean continued or
- 37 accelerated global warming for the 21st Century which may contribute to
- continued or accelerated rise in global mean sea-level.

### 1 **3.4.1** Existing Conditions

- 2 The climate in Saipan is warm and humid throughout the year and is classified as tropical
- 3 marine, with an average temperature of 75 to 80 degrees Fahrenheit (Vander Brug, 1985).
- 4 Rainfall in the study area is seasonal and averages about 75 to 80 inches per year. The
- 5 wet season usually extends from July through November, followed by a dry season from
- 6 December through June. Saipan experienced drought-like conditions during 1998, when
- 7 the rainfall between January and November totaled roughly 41 inches, or roughly half the
- 8 annual mean.
- 9 The dominant winds in the Northern Marianas are trade winds, which blow from the east
- 10 or northeast. These winds are strongest and most constant during the dry season, when
- wind speeds of 15 to 25 miles per hour are common. During the rainy season, the trade
- winds often cease, and on some days the weather may be dominated by westerly moving
- 13 storm systems that bring heavy showers or steady, at times torrential, rains. These
- episodic, heavy rainfall events contribute the majority of the sediment and surface water
- 15 runoff that reaches the nearshore lagoon environment. Some of these heavy rainfall
- 16 events occur during typhoons.
- 17 According to the EPA, "the air quality in American Samoa, Guam, and CNMI is
- generally pristine, due to the wet climate, strong prevailing winds, and distance from any
- 19 pollution sources" (EPA, 2006). The air quality within the study area was reported as
- 20 generally good in a November, 2003 letter from the CRMO (Appendix D).

# 21 **3.4.2 Potential Impacts and Mitigation**

- 22 No Action
- 23 Under the No Action alternative there would be no additional impact to air quality within
- the study area.
- 25 Preferred Alternative
- 26 The Preferred Alternative would have less than significant impacts to air quality during
- 27 construction activities (i.e., fugitive dust emissions and GHG emissions from motorized
- 28 equipment exhaust). Potential impacts would be mitigated by utilizing BMPs during the
- 29 construction process, including proper maintenance and function of construction
- 30 equipment. There would be no long term impacts to air quality from the operation of the
- 31 proposed detention basin.
- 32 Additionally, there is no indication that sea level rise or ocean acidification would
- 33 impact the preferred action. The basin would be far above the existing shoreline and
- 34 therefore would not contribute to acidification because it would detain sediment from
- 35 entering the lagoon.

#### 36 3.5 HYDROLOGY AND WATER QUALITY

- 37 The watershed within the study area is predominately underlain by the Mariana
- 38 Limestone unit. This limestone unit is composed mostly of finely to coarsely
- fragmented, commonly coralliferous, algal, and, in part, clayey limestone (Cloud et al.,
- 40 1956). The Mariana Limestone typically is white to gray colored, moderately to

- 1 cavernously porous, and non-bedded to indistinctly bedded. In the coastal portions of the
- 2 study area, the land surface is typically covered by recent alluvium derived from erosion
- 3 of the upland limestone areas.
- 4 Residents of the island of Saipan are almost entirely dependent on groundwater as a
- 5 drinking water source. Historically, limited amounts of generally brackish water have
- 6 been exploited by dug wells along the coastal portion of the watershed. Potable water is
- 7 extracted from deep wells (the Gualo Rai well field) located in the inland portions of the
- 8 watershed.

9

#### Regulatory Background

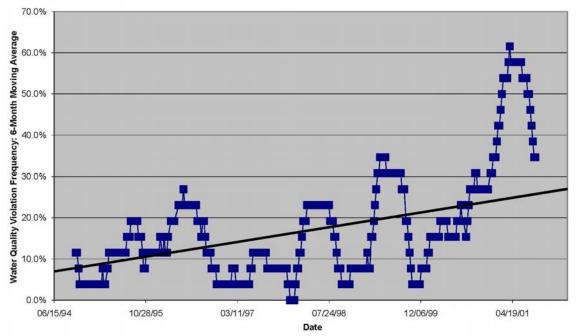
- 10 The CNMI has designated two classes of water (AA and A) for marine uses. Class AA
- represents high-quality waters that are considered to be in a "natural" and "pristine" state.
- 12 The CNMI Water Quality Standards states that "to the extent practicable, the wilderness
- 13 character of such areas shall be protected," and does not permit any discharge of
- pollutants in Class AA waters. Class A waters have been designated in two parts of
- Saipan, and generally represent a slightly lower quality of water in which some
- discharges may be permitted, for example, the two sewage treatment plant outfalls on
- Saipan. Nevertheless, Class A waters must support recreational use and the propagation
- of fish, shellfish, and wildlife, and strict water quality standards have been set for the
- 19 protection of these uses in Class A marine waters. Additionally, further protection is
- protection of these uses in class A marine waters. Additionally, future protection is
- afforded through the CNMI Anti-Degradation Policy, which is part of the Water Quality
- 21 Standards and protects existing uses and water quality in any waters, despite their
- 22 classification.

### 23 **3.5.1** Existing Conditions

#### 24 Surface Water

- 25 The lagoon water within the study area is designated as Class AA waters. However,
- 26 beach closures due to high levels of microbiological contamination are becoming
- 27 increasingly frequent along the west coast of Saipan. An interpretation of water quality
- 28 data collected by CNMI DEQ over an eight-year period indicates that there is a
- 29 significant trend of increasing microbiological contamination (enterococci bacteria)
- detections exceeding water quality standards. Figure 5 shows the increasing incidence of
- 31 water quality violations at Garapan Fishing Dock located at the northern end of the study
- 32 area.

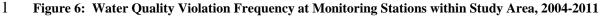
Figure 5: Water Quality Violation Frequency at Garapan Fishing Dock, 1994-2002

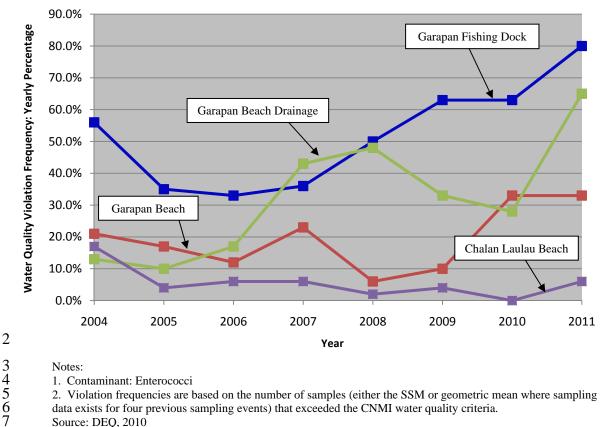


Source: DEQ, 2010

This increase in bacteriological contamination is a direct result of an increase in non point source pollution associated with urbanization and population growth. Non-point source contamination occurs predominantly from surface runoff and sediments transported by runoff, solid and human waste disposal, and agricultural activities.

Water quality data from 38 fixed stations along Saipan's most commonly used west coast beaches collected during more recent years by the CNMI DEQ indicate that sampling sites within the West Takpochau (Central) Watershed continue to consistently experience a significant number of water quality violations, leading to multiple "impaired" (violation frequency exceeds 10 %) or "significantly impaired" (violation frequency exceeds 25 %) listings (DEQ, 2010). Beach advisories notifying the public that the beach waters within 300 feet of the sampling point are not safe for swimming are triggered when either the single sample maximum (SSM) or geometric mean for the most recent four sampling events exceeds the CNMI water quality criteria. Figure 6 shows the yearly percentage of water quality violations from 2004 to 2011 at four of the CNMI DEQ sampling stations that fall within the study area. Three stations (Garapan Fishing Dock, Garapan Beach, and Garapan Beach Drainage) occur at the northern end of the study area whereas Chalan Laulau Beach occurs within the southern portion of the study area.





8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

1. Contaminant: Enterococci

2. Violation frequencies are based on the number of samples (either the SSM or geometric mean where sampling data exists for four previous sampling events) that exceeded the CNMI water quality criteria. Source: DEQ, 2010

Water quality violation frequency over the past eight years at the three stations located at the northern end of the study area show an overall increasing trend, which is likely due to the more densely populated and urbanized areas within the northern part of the study area. On the other hand, water quality violations at Chalan Laulau Beach in the West Takpochao (South) Watershed, where less population and urbanization is observed, peaked in 2004 at 17%, and have subsequently decreased to 0-6%. The CNMI has proposed to delist the West Takpochao (South) segment from the impaired listing due to enterococci contamination because of the improvement in water quality within this segment. However, listing of the CNMI waters specific to aquatic life lists the West Takpochau (South) watershed as impaired, total maximum daily load (TMDL) required, and medium priority. The impaired listing is attributable to dissolved oxygen (DO), biocriteria, and orthosphosphate from sanitary sewer overflows, urban runoff, and sedimentation. The West Takpochau (Central) Watershed is listed as impaired, TMDL required, and high priority. The impaired listing is specific to aquatic life, fish consumption, and recreation due to enterococci, mercury, DO, biocriteria, and orthophosphate from sanitary sewer overflows, urban runoff, and sedimentation (DEO, 2010). Water quality data collected within the study area as well as the impairing listings of the watershed area that falls within the study area indicate that degradation of the water quality within the lagoon due to anthropogenic activities on land remain an issue and continued close monitoring of the lagoon water quality is necessary.

#### Groundwater

1

- 2 Groundwater in the western portion of Saipan occurs as an unconfined fresh to brackish
- 3 water lens that overlies saltwater. The top of the aquifer is thus bound by the water table
- 4 surface. Groundwater flows at a moderate gradient towards the ocean, becoming more
- 5 brackish near the ocean. The base of the aquifer in the inland portions of the watershed
- 6 is the westward plunging contact between volcanic basement and overlying coralline
- 7 deposits. The depth to the volcanic basement in the coastal portions of the study area is
- 8 unknown. The regional aquifer at the subject site is made up of the coral and
- 9 coral-derived material of the Marianas Formation. Due to the high permeability of this
- 10 limestone unit, the water levels within this aquifer fluctuate with ocean tides.
- 11 Two types of aquifers are dominant on Saipan, isolated limestone aquifers and the more
- prevalent basal aquifer, the predominant source of freshwater on the island. Due to the
- 13 limited freshwater sources, the location and distribution of these aguifers is of extreme
- importance in the CNMI. Urban growth and an increase in population have led to several
- issues that threaten the freshwater aguifers. Increasing demand of freshwater has led to
- over-pumping of the basal lens aquifer, causing high chloride levels due to saltwater
- intrusion. Point source and nonpoint-source pollution due to heavy urbanization can also
- threaten ground water sources through infiltration of the study area's highly permeable
- 19 top soils.

### 20 **3.5.2 Potential Impacts and Mitigation**

#### 21 No Action

- 22 Under the No Action alternative there would be significant cumulative impacts to the
- 23 lagoon water quality. Sediment, nutrients and other pollutants entrained in stormwater
- 24 would continue to flow into the lagoon. As a result, the lagoon water quality could
- continue to fall below water quality standards set by the CNMI.

#### 26 Preferred Alternative

- 27 The Preferred Alternative would result in beneficial impacts to the lagoon water quality
- 28 since sediment and other suspended solids would be filtered from the stormwater at the
- 29 proposed detention basin site. The Preferred Alternative would beneficially impact 70.33
- 30 LGHUs within the lagoon.

#### 31 3.6 TRAFFIC AND CIRCULATION

- 32 Vehicular traffic data was supplied by traffic count reports from the CNMI DPW
- 33 conducted in 2007. Several intersections were chosen within the study area for 24-hour
- 34 monitoring sessions. The traffic data supplied by the CNMI DPW is included in
- 35 Appendix B.

#### 36 **3.6.1** Existing Conditions

- 37 Beach Road and Middle Road are the primary transportation corridors on the western
- 38 coast of the island. They run north and south along the coast and are main thoroughfares
- 39 for the urbanized areas along the low land coastal area. Within the study area boundaries,

- 1 Gualo Rai Road and Quartermaster Road run perpendicular east and west. The results of
- 2 the 2007 CNMI DPW traffic count report at key intersections affecting the study area are
- 3 shown in Table 6. Peak a.m. traffic within the study area roadway network ranges from
- 4 106 to 846 cars per hour. Peak p.m. traffic within the study area roadway network ranges
- 5 from 132 to 991 cars per hour.

6

**Table 6: Traffic Count Survey** 

Monitoring Location	Weekly a.m. peak traffic count (time)	Weekly p.m. peak traffic count (time)	Average a.m. traffic counts (7:00-11:00)	Average p.m. traffic counts (12:00-17:00)
Middle Road South of Navy Road	649 (7:00)	664 (13:00)	368.50	352.08
Beach Road South of Micro Beach	344 (11:00)	400 (17:00)	259.08	256.56
Quartermaster Road between Beach and Middle Road	106 (7:00)	132 (14:00)	35.18	51.44
Beach Road north of Quartermaster Road	548 (11:00)	784 (17:00)	300.33	442.78
Middle Road north of Quartermaster Road	846 (11:00)	991 (14:00)	450.58	609.36
Middle Road south of Sugar King Road	686 (11:00)	768 (13:00)	418.40	506.32

### 7 3.6.2 Potential Impacts and Mitigation

#### 8 No Action

- 9 Under the No Action alternative no significant impacts to traffic are anticipated since the
- 10 existing site conditions would remain unchanged.

#### 11 Preferred Alternative

- 12 The Preferred Alternative would result in less than significant traffic circulation impacts
- that would occur during the construction phase from additional vehicle trips to and from
- 14 the proposed detention basin site via the local roadway network. These impacts would be
- 15 mitigated to a level of insignificance by proper forward planning utilizing BMPs,
- including a traffic control plan to be approved by the CNMI DPW before commencement
- of work. With these mitigation measures in place, impacts to the existing roadway
- 18 network would be less than significant.

#### 1 3.7 BIOLOGICAL RESOURCES

- 2 The U.S. Fish and Wildlife Coordination Act (FWCA) requires all Federal agencies to
- 3 consult with and give strong consideration to the views of the U.S. Fish and Wildlife
- 4 Service (USFWS), the National Marine Fisheries Service (NMFS), and State wildlife
- 5 agencies regarding the fish and wildlife impacts of projects that propose to impound,
- 6 divert, channel, or otherwise alter a body of water. USACE initiated consultation with
- 7 USFWS and NMFS in August 2003 and continued in October 2011. Copies of
- 8 correspondence are included in Appendix D. Resource agencies indicated that no critical
- 9 habitat are designated or proposed in the project area, and no candidate species are
- 10 known to exist in the Saipan area.

#### 11 3.7.1 Existing Conditions

- 12 The terrestrial habitat within and adjacent to the study area is dominated by urban
- landscaping and bird species. Other than birds, there are few terrestrial animals, such as
- 14 the introduced marine toads (*Bufo marinus*), African land snails (*Achatina fulica*), and
- domesticated farm animals in Saipan. Of the abundant avifaunal species monitored on
- the island, there tends to be a negative correlation between the density of native species
- and urbanization. Highly urbanized areas retain more exotic species.
- 18 The Saipan Lagoon nearshore environment is generally composed of a sand and
- sand/silt/rubble substrate covered by thick stands of seagrass and algae with only an
- 20 occasional coral head or limestone outcropping. Heavy input of freshwater (groundwater
- 21 and surface water runoff) into the nearshore environment is conducive to dense beds of
- large bladed, tall (up to three feet) seagrass (*Enhalus acoroides*) which are found in a 10
- 23 to 50 meter-wide band along the shoreline. Freshwater and nutrients are known to
- 24 enhance the growth of *Enhalus*, but excessive nutrients are believed to promote abundant
- 25 macro-algal growth that can have an adverse impact on corals and the function of the
- 26 marine ecosystem. Intermixed between stands of *Enhalus* and extended further out into
- 27 the lagoon, often to the reef, is the very common short seagrass Halodule uninervis,
- 28 which covers 20 to 70% of the benthic substrate in the lagoon between the Enhalus beds
- and the coral reef. Macroalgae species are abundant (especially near-shore) including
- 30 Halimeda, Padina, Caulerpa, Laurencia, Acanthophora and Dictyota as the most
- 31 common genera. In areas of high nutrient influx, such as the northern end of the study
- 32 area near Garapan, two types of rapid growth macroalgae are dominant; Enteromorpha
- 33 and Cladophora. The green, hair-like Enteromorpha and the pale hair-like Cladophora
- 34 have become nuisance algae because of their undesirable appearance and abundance
- along beaches and in the near-shore lagoon that are used for tourist activities.
- 36 Corals in the inshore zone are very sparse and are characterized by scattered, small
- 37 colonies of *Porites lutea* and *Pocillopora damicornis*. Live coral cover is less than one %
- overall, but some areas may support colonies of *Porites* and *Pocillopora* at densities up to
- 39 five percent. Invertebrates present in the inshore zone include the common sea cucumber
- 40 genera Holothuria, Actinopyga, and Bohadschia, the large starfish Linckia laevigata, and
- 41 the clam known locally as "Amsum". Lagoon fish resources include rabbitfish (Siganus),
- 42 mullet (Mugilidae), goatfish (Mullidae), snappers (Lutjanidae), the emperor fish
- 43 (*Lethrinus harak*), and silversides (Atherinidae).

- 1 Juveniles of many species may be found in the seagrass beds and occasional predatory
- 2 species such as groupers, jacks and barracuda may also be present. This resource is
- 3 utilized by local fishermen for subsistence and sport. It is of common opinion that the
- 4 inshore fisheries are in decline, and information from the CNMI DLNR supports this
- 5 contention (DLNR, 1998). Specific habitat units have been identified and delineated by
- 6 the MMT. Additionally, fish surveys conducted by the University of Guam revealed a
- 7 major decline in abundance of some of the major food fish groups between 1979 and
- 8 1996 in Saipan Lagoon (Starmer et al., 2008).
- 9 An island-wide market survey in 2009 documented the continued decline of nearshore
- fisheries (Houk, 2010). Initial consultation with NOAA staff indicated that no designated
- critical habitats for terrestrial species are listed in the study area. Further consultation
- was conducted with the CNMI DLNR, DFW in October, 2011. The CNMI DLNR DFW
- responded to consultation in October, 2011 in a letter with a list of species of concern for
- 14 the CNMI. The letter stated that a biological survey would be completed during the
- 15 construction permitting process in order to identify any species of concern within the
- 16 study area (Appendix D).
- 17 The following marine mammals under the protection of the Marine Mammal Protection
- 18 Act that have been identified in the region (NOAA, 2012):
- Bryde's whale (*Balaenoptera edent*);
- Cuvier's beaked whale (*Ziphius cavirostris*);
- Pygmy sperm whale (*Kogia breviceps*);
- Melon-headed whale (*Peponocephala electra*);
- Pygmy killer whale (*Pseudorea crassidens*);
- Killer whale (*Oreinus orea*);
- Short finned pilot whale (*Globicephaia macrorhynchus*);
- Spinner dolphin (*Stenella longirostris*);
- Striped dolphin (Stenella coeruleoalba);
- Pantropical spotted dolphin (*Stenella attenuate*);
- Common dolphin (*Delphinus delphis*); and
- Risso's dolphin (*Grampus griseus*)
- 31 Listed species under the National Marine Fisheries Service do not have designated
- 32 critical habitats in Saipan. Identified aquatic endangered species in the CNMI include the
- 33 Green Sea Turtle and the Hawksbill Sea Turtle (USFWS, 2011). Further, several coral
- 34 species known to exist within the Saipan lagoon are being considered for addition to the
- 35 threatened or endangered species list by NOAA (NOAA, 2012).
- 36 CNMI DFW indicates that several species of concern and federally listed endangered
- 37 species exist in the CNMI. However, none of the listed species habitats are known to

- 1 exist within the study area. The following species were identified in a letter from CNMI
- 2 DFW (October, 2011):
- Nightingale Reed Warbler (Acrocephalus luscinia);
- Mariana Common Moorhen (Gallinula chloropus guami);
- Micronesian Megapode (megapodius laperouse);
- Mariana Fruit Bat (*Pteropus mariannus*);
- Mariana Swiftlet (Aerodrames bartschi);
- 8 Rota Bridled White-eye (*Zosterops rotensis*); and
- Mariana Crow (Corvus kubaryi)
- 10 Listed species under the National Marine Fisheries Service do not have designated
- 11 critical habitats in Saipan.

# 12 3.7.2 Potential Impacts and Mitigation

- 13 No Action
- 14 Under the No Action alternative there would be cumulative impacts to lagoon habitats
- 15 from the continued uncontrolled runoff from the study area. There would be no controls
- 16 implemented to address the degraded ecosystem within the lagoon. Biological resources
- within the lagoon would continue to be impacted from sedimentation and other pollutants
- 18 suspended in runoff waters.

#### 19 Preferred Alternative

- 20 Subsection 2(h) of FWCA-Exempt Project Activities. FWCA exempts surface water
- 21 impoundments less than 10 acres. "The provisions of the Act shall not be applicable
- 22 to...projects for the impoundment of water where the maximum surface area...is less than
- 23 10 acres" (Water Resources Development Under the Fish and Wildlife Coordination Act,
- 24 November 2004).
- 25 The proposed action does not include work in streams nor any body of waters;
- 26 channelization; diversion of streams or storm drains etc. All work shall be done on urban
- 27 land determined to be absent of fish and wildlife. However, USACE conducted
- 28 consultation with USFWS and NMFS in an effort to consider the range of alternatives as
- 29 part of the ecosystem restoration project.

#### 30 Terrestrial and Aquatic Biological Resources

- 31 Due to the apparent absence of threatened or endangered species, critical habitat or
- 32 candidate species in the project area, no mitigation measures are proposed. There would
- 33 be indirect beneficial impacts to aquatic biological resources within the Saipan lagoon
- 34 under the Preferred Alternative. The proposed detention basin would help to reduce
- 35 sediment runoff into the lagoon, improving the water quality. Improved water quality
- would help to restore degraded lagoon habitats.

September 2013

#### 1 3.8 HISTORICAL AND CULTURAL RESOURCES

# 2 **3.8.1** Existing Conditions

- 3 Section 106 of the NHPA consultation conducted February 18, 2003 and October 30,
- 4 2012 with the CNMI Department of Community and Cultural Affairs indicated that the
- 5 Cock Fight Arena site consisted of an abandoned modern-day quarry prior to its current
- 6 use. A two person USACE, Honolulu District (USACE POH) pedestrian reconnaissance
- 7 level survey was conducted at a 10 meter transect spacing of the entire area of potential
- 8 effect in August, 2003. No cultural resources were located. Based on the 2003 survey of
- 9 the study area and research conducted, the Cock Fight Arena site has a low probability
- 10 for having historical or archeological resources. The reconnaissance level surface survey
- of the area identified no archaeological or cultural resources, as documented in the staff
- 12 archaeologist's project file in the Environmental Programs Branch, USACE, Honolulu
- 13 District, Fort Shafter, Hawaii.

14

- 15 Background research, consultation with CNMI Historic Preservation Office (HPO), and a
- 16 pedestrian two-person reconnaissance level survey helped conclude that the Cockfight
- 17 Arena site is a low probability area for historical or archaeological resources (refer to
- 18 letters in Appendix D). USACE has determined that the undertaking will result in no
- 19 historic properties affected as indicated in its letter to CNMI HPO dated October 30,
- 20 2012. Copies of all correspondence documenting the Section 106 consultation conducted
- are included in Appendix D.

# 22 3.8.2 Potential Impacts and Mitigation

- 23 No Action
- 24 Under the No Action alternative there would be no disturbance to the proposed project
- area, therefore there would be no change to the existing environment. There would be no
- 26 impacts to historical or cultural resources.
- 27 Preferred Alternative
- 28 The Preferred Alternative would have no adverse effect to historic properties. However,
- 29 prior to the start of any ground breaking construction activities associated with this
- 30 project, an AMP shall be completed by a qualified archaeologist and submitted to the
- 31 CNMI HPO for review and comments before its finalization prior to groundbreaking
- 32 activities. Further, monitoring by a qualified archeologist is recommended for any
- activities to ensure proper treatment of any possible subsurface historical,
- 34 cultural and/or archeological resources encountered. A full archaeological report
- 35 documenting the results of the archaeological monitoring activities shall also be
- 36 submitted at the end of all construction activities to the CNMI HPO for the agency's
- 37 library and files. Based on USACE POH Archaeological evaluation of the project area, it
- is concluded that the presence of a qualified archaeologist during construction will ensure
- 39 the protection of potentially significant cultural resources including human burial remains
- 40 that may be present subsurface within the project's area of potential effect. USACE POH
- 41 has concluded that with the presence of a qualified archaeologist monitor during all new
- 42 ground breaking construction activities as well as the submittal of a final AMP and post-

- 1 monitoring archaeological report to CNMI HPO, a determination can be made that the
- 2 Preferred Alternative shall have no adverse effect to historic properties.

# **3 3.9 LAND USE**

#### 4 3.9.1 Existing Conditions

- 5 The study area is located just south of the urbanized area of Garapan, and is characterized
- 6 as medium density in the north and low density within the southern portion of the study
- 7 area (Figure 7). The proposed detention basin site is zoned Mixed Commercial and
- 8 Rural. The Mixed Commercial "district provides for a broad spectrum of commercial
- 9 development that requires a moderate to high level of vehicular access and for low to
- moderate density residential development" (CNMI, 2008). The primary purpose of Rural
- lands is to "maintain rural character and control development sprawl" (CNMI, 2008).
- 12 The detention basin site is located within an urbanized strip of land located adjacent to
- 13 Middle Road. Development in this area consists of light industrial, commercial, retail
- and residential uses. The Gualo Rai residential area lies upslope and inland of Middle
- Road. Many of the small side roads and lots are unpaved. There are stormwater drains
- 16 along Middle Road and Beach Road, but there is no comprehensive collection and
- 17 conveyance system designed to control storm water within the developed areas in the
- 18 Guala Rai district and between Middle and Beach Roads.

# 19 **3.9.2 Potential Impacts and Mitigation**

### 20 No Action

21

2425

26

32

33

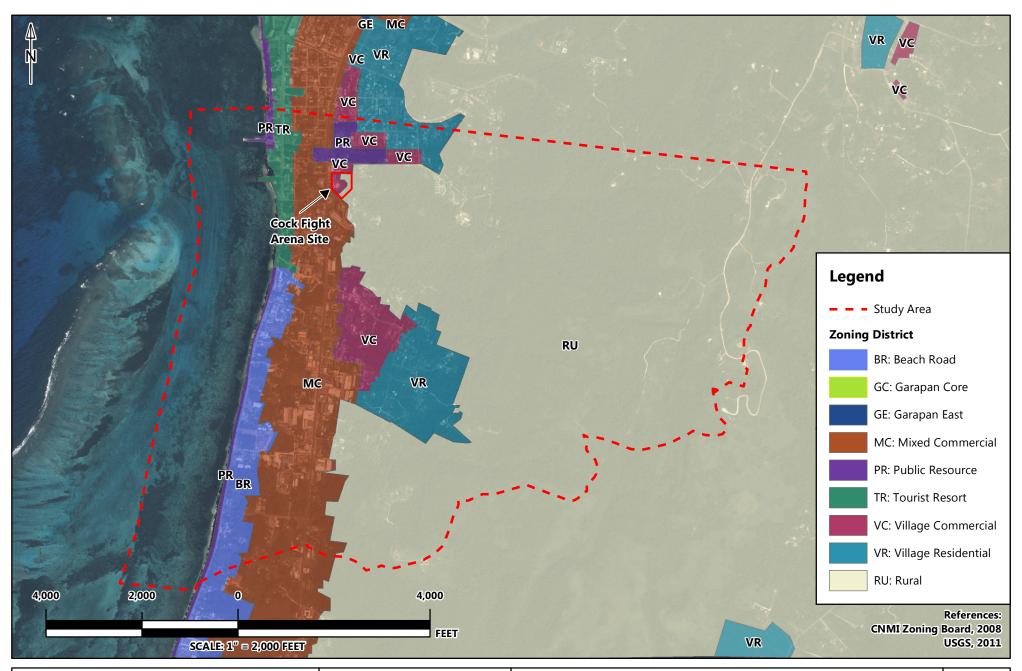
22 Under the No Action alternative no changes to current land uses would occur. Therefore,

there would be no impact to land use within the study area.

#### Preferred Alternative

The Preferred Alternative would have insignificant impacts on land use within the study area. The proposed detention basin would represent a change in land use from periodic recreational use to public lands used as a detention basin. Since the proposed detention basin site is only used periodically for recreational use as a Cock Fight Arena, and since the proposed action would benefit the public and the surrounding environment, there

would not be significant impacts to land use.



-ÇiEnvironet, Inc	•
-------------------	---

PROJECT NO.: 1057	ENVIRONMENTAL ASSESSMENT	
DATE: APRIL, 2013	SAIPAN LAGOON AQUATIC ECOSYSTEM RESTORATION STUDY	FIGURE
DRAWN BY: CB	LAND USE PLAN REFERENCE MAP	7
REVIEWED BY: MA	SAIPAN, CNMI	

## 1 3.10 VISUAL AESTHETICS

## 2 **3.10.1 Existing Conditions**

- 3 The study area is moderately urbanized, but retains the visitor quality of the urban center
- 4 of Garapan with a mixture of quaint stores surrounded by pristine scenic views of
- 5 mountains to the east, vast ocean to the west, and undeveloped coastal land stretching
- 6 north and south.

7

- 8 The study area is located in a coastal lowland strip that stretches north and south along
- 9 the west side of the island. The coast is fronted by a barrier reef on the west, and to the
- 10 east the island is characterized by a mountainous interior. The study area is composed of
- 11 clustered buildings and residences surrounded by lush vegetation. Scenic locations
- remain along the coast and in the less developed areas of the island.

## 13 **3.10.2 Potential Impacts and Mitigation**

- 14 No Action
- 15 Under the No Action alternative there would be no change to visual and aesthetic
- 16 resources within the study area. Therefore, there would be no impact to visual and
- 17 aesthetic resources.
- 18 Preferred Alternative
- 19 The Preferred Alternative would result in insignificant impacts to visual and aesthetic
- 20 resources within the study area during the construction period. The presence of
- 21 construction equipment and activity at the proposed detention basin site would be visible
- 22 to the surrounding environment. However, since the construction period would be
- 23 temporary, impacts would be insignificant. The proposed detention basin would be a
- low-lying structure, most of which would be a below-grade depression that would not
- create significant visual impacts.

## 26 3.11 RECREATION/RESOURCE USE

## 27 **3.11.1 Existing Conditions**

- 28 Recreational activities in Saipan consist of both terrestrial and water-based activities
- associated with the tourism industry, as well as local participation. The Garapan region is
- 30 located north of the study area, and is the largest resort/tourism center on the island. The
- 31 Saipan Lagoon provides a large, calm, and relatively shallow area of water that is used
- 32 for a variety of aquatic recreational activities including swimming, windsurfing, surfing,
- fishing, jet skiing, kayaking, snorkeling, scuba diving, and water skiing. Terrestrial
- 34 recreational activities for both tourists and residents include shopping, indoor shooting
- ranges, and a variety of restaurants, night clubs and bars. A recreational, paved beach
- 36 path stretches south from Garapan approximately two miles and provides a scenic,
- 37 protected area for walking, bike riding, and jogging.

- 1 Golfing, mountain biking and hiking are also popular recreational activities in Saipan.
- 2 There are also several shoreline grottos on the northern end of the island that are popular
- 3 scuba diving destinations for numerous tour companies on the island.

## 4 3.11.2 Potential Impacts and Mitigation

- 5 No Action
- 6 Under the No Action alternative there would be no impacts to recreation or resource use
- 7 since there would be no use of additional recreational areas or resources.
- 8 Preferred Alternative
- 9 Under the Preferred Alternative, the Cock Fight Arena would be impacted because it
- would no longer be used for recreational purposes. However, since the site is not used on
- 11 a regular basis, and could be relocated, impacts would be less than significant. The
- 12 Preferred Alternative would require the commitment of natural resources such as
- 13 aggregate for concrete and petroleum products to fuel construction equipment. The
- amount of resources needed to complete the detention basin would not represent a
- significant commitment of resources. Therefore, impacts to recreation and resource use
- would be insignificant.

20

#### 17 3.12 ECONOMIC AND SOCIAL RESOURCES

## 18 **3.12.1 Existing Conditions**

19 Table 7 shows selected social and economic information for the CNMI.

**Table 7: CNMI Social and Economic Characteristics** 

Population	53,833	
Median Age	33.4	
Ethnic Origin or Race (% of total population)		
Native Hawaiian and	34.9	
other Pacific Islander		
Asian	49.9	
Other Race	15.2	
Total Households	16,035	
Average Household	3.80	
Size		
Labor Force	27,968	
Unemployment Rate	8.1 %	
Industry or Trade(% of total workforce)		
Arts, Entertainment,	22.2	
Recreation, and		
Accommodation and		
Food Services		
Educational Services,	12.4	
and Health Care and		
Social Assistance		
Retail Trade	10.7	
Other Services,	10.3	
except Public		

**Table 7: CNMI Social and Economic Characteristics** 

Administration	
Public Administration	9.7
Construction	7.2
Other Industry	27.5

- 1 Source: American Fact Finder, 2010.
- 2 As shown in Table 7, arts, recreation and accommodation and food services offer the
- 3 greatest number of jobs to residents, followed by education, health care and social
- 4 assistance. The unemployment rate in the CNMI is 8.1 %.

## 5 3.12.2 Potential Impacts and Mitigation

- 6 No Action
- 7 Under the No Action alternative there would be no impact to economic and social
- 8 resources. There would be no jobs created or lost, or any action resulting in an impact to
- 9 social systems or services.
- 10 Preferred Alternative
- 11 Under the Preferred Alternative there would be beneficial impacts to economic and social
- 12 resources from added construction employment, as well as ongoing employment
- associated with the operation and maintenance of the proposed detention basin.

# 3.13 CUMULATIVE IMPACTS ASSOCIATED WITH THE PREFERRED ALTERNATIVE

Cumulative impacts are two or more individual effects which, when considered together, compound or increase the overall impact. Cumulative impacts can arise from the individual effects of a single action or from the combined effects of past, present, or future actions. Thus, cumulative impacts can result from individually minor but collectively significant actions taken over a period of time. The cumulative impacts of the proposed action along with past and reasonably foreseeable future projects proposed were assessed based upon available information.

222324

25

26

27

28

29

30

31

14

15

16

17

18

19

20

21

CNMI Office of the Secretary of Public Works (DPW) plans to improve Route 33 (Beach Road) by repairing or reconstructing the existing pavement structure, improving surface drainage conditions, and incorporating pedestrian and bike lane features where warranted. Drainage improvements are proposed for the roadway improvement project and are not expected to result in any adverse cumulative impacts when implemented in conjunction with the Preferred Alternative. BMPs implemented in conjunction with construction activities under the Preferred Alternative are not expected to result in cumulative adverse impacts. No other projects are known to be planned in the surrounding area that would compound or increase the impact of the Preferred Alternative.

32 33 34

35

The Preferred Alternative would not lead to any adverse cumulative impacts. The proposed detention basin under the Preferred Alternative would lead to beneficial

 cumulative impacts to water quality in surface water and the Saipan Lagoon. The detention basin would remove sediment and other suspended solids from stormwater runoff within the study area. This would lead to a reduction in sediment loads and other pollutants entering the lagoon, which would improve water quality within the affected area of the lagoon. An improvement in water quality could lead to ecosystem restoration for lagoon habitats.

## 4. RELATIONSHIP TO ENVIRONMENTAL REGULATIONS

#### 4.1 FEDERAL CLEAN WATER ACT

- 3 The Clean Water Act (CWA) establishes the basic structure for regulating discharges of
- 4 pollutants into the waters of the U.S. and regulating quality standards for surface waters.
- 5 The federal CWA prohibits the discharge of dredged or fill material into waters of the
- 6 U.S. without authorization from the USACE. Because construction BMPs would be
- 7 implemented under the Preferred Alternative, construction related runoff of any soil or
- 8 fill material would be controlled. There would be no discharge of dredged or fill material,
- 9 and a CWA authorization under Section 404 would not be required.

## 10 4.2 FEDERAL CLEAN AIR ACT (CAA)

- 11 The federal CAA (42 USC 7401) requires the adoption of national ambient air quality
- standards to protect public health, safety, and welfare from known or anticipated effects
- of air pollution. The CNMI utilizes the NAAQS regulated by the EPA to provide
- established sets of ambient air quality standards to protect human health and welfare.
- 15 Administrative Code DEQ Chapter 65-10: Air Pollution Regulations establishes
- standards to insure that air resources are protected against pollution and do not constitute
- a health hazard. Since impacts to air quality from the Preferred Alternative would only
- 18 include exhaust emissions from construction equipment and vehicles during the
- 19 construction of the proposed detention basins, there would be less than significant
- 20 impacts to air quality.

1

2

## 21 4.3 EXECUTIVE ORDER (EO) – PROTECTION OF CORAL REEFS

- 22 EO 13089 states that "all Federal agencies whose actions may affect U.S. coral reef
- ecosystems shall: (a) identify their actions that may affect U.S. coral reef ecosystems; (b)
- 24 use their programs and authorities to protect and enhance the conditions of such
- ecosystems; and (c) to the extent permitted by law, ensure that any actions they authorize,
- 26 fund or carry out will not degrade the conditions of such ecosystems." Potential adverse
- 27 impacts from construction runoff under the Preferred Alternative would be mitigated by
- 28 the institution of BMPs, including silt fences and other engineering controls. The
- 29 proposed detention basin would remove sediments and other suspended solids from
- 30 runoff waters before entering the lagoon. This would contribute to improved coral
- 31 health. Therefore, there would be beneficial impacts to coral reefs within the study area
- 32 under the Preferred Alternative.

33

#### 4.4 COASTAL ZONE MANAGEMENT ACT (CZMA)

- 34 The CZMA of 1972, as amended (16 USC 1451 et seq.), is administered in Saipan by the
- 35 CNMI CRMO. The CZMA affects all projects on federal lands and/or involving federal
- 36 agencies and requires federal agencies to conduct their planning, management,
- development and regulatory activities in a manner consistent with the state's coastal zone
- 38 management (CZM) program. The CZM program objectives and policies are to provide
- 39 coastal recreational opportunities; preserve and protect historic, scenic and coastal
- 40 ecosystem resources; provide economic uses; reduce coastal hazards; improve public

- 1 awareness in coastal zone management; and manage development within the coastal
- 2 zone. The entire island of Saipan is located within the coastal zone. The CNMI CRMO
- 3 is the lead sponsor for the proposed project, the purpose of which is to reduce the amount
- 4 of sediment and other suspended solids from entering the lagoon via stormwater runoff.
- 5 Therefore, the Preferred Alternative would comply with the CRMO Regulation 15-10;
- 6 Coastal Resources Rules and Regulations, and would have a beneficial impact on coastal
- 7 resources.

## 8 4.5 THE ENDANGERED SPECIES ACT (ESA)

- 9 The ESA of 1973, Section 7 requires federal agencies to conduct consultation to
- determine effects of an action on threatened and endangered species or their designated
- 11 habitats.
- 12 The USFWS and the CNMI DLNR DFW have jurisdiction over endangered and
- threatened terrestrial flora, fauna, and birds. NOAA, through the National Marine
- 14 Fisheries Service has jurisdiction over marine mammals and fish.
- 15 The CNMI DLNR DFW provided a list of species of concern that exist within the CNMI.
- Once the specific areas for development are delineated during the permit process, the
- 17 CNMI DLNR DFW will complete a biological survey of the proposed development sites
- and determine the need for any mitigation measures if any species of concern are found
- 19 to exist within the development areas. With these mitigation measures in place there
- would be no impacts to biological resources under the Preferred Alternative.

### 21 4.6 FISH AND WILDLIFE COORDINATION ACT

- 22 The U.S. Fish and Wildlife Coordination Act and its amendments require Federal
- 23 agencies to consult with and give equal consideration to other water resources
- 24 development programs regarding the fish and wildlife impacts of projects that propose to
- 25 impound, divert, channel, or otherwise alter a body of water.
- 26 The USFWS has conducted various biological surveys in Saipan, including the Final
- 27 Coordination Act Report for the Garapan Flood Control Study and the Biological
- 28 Opinion Study for Chalan Laulau. These reports are included in Appendix C. An
- 29 inshore lagoon area seagrass and associated fauna survey was conducted in the study area
- 30 in May of 2002 by the MMT, and a study of seagrass and macroalgal assemblages in
- 31 Saipan Lagoon was also conducted in 2010 (Houk, and R. Camacho, 2010). A wetlands
- 32 conservation plan for the CNMI was completed by the CNMI Department of Lands
- Natural Resources (DLNR) in 1989 (DLNR, 1989). A wetland site assessment conducted
- 34 by CRMO personnel in November of 2003 found no evidence of wetlands within the
- 35 affected portions of the study area.
- 36 Subsection 2(h) of FWCA-Exempt Project Activities. FWCA exempts surface water
- impoundments less than 10 acres. "The provisions of the Act shall not be applicable to
- projects for the impoundment of water where the maximum surface area is less than 10
- 39 acres." The proposed action does not include work in streams nor any body of waters;
- 40 channelization; diversion of streams and storm drains etc. All work shall be done on
- 41 urban land determined to be absent of fish and wildlife.

- 1 Water-diversion structures in the form of a retention basin are included in the proposed
- 2 construction activities for this EA. However, the construction of the retention basin
- 3 would ultimately reduce the discharge of pollutants into the lagoon ecosystem. As a
- 4 result, the Preferred Alternative would have an indirect beneficial impact on the fish and
- 5 wildlife that exist within the lagoon ecosystem.

## 6 4.7 MARINE MAMMAL PROTECTION ACT (MMPA)

- 7 The Marine Mammal Protection Act (MMPA) was enacted in 1972 in order to prohibit
- 8 the "take" of marine mammals within U.S. waters, the "take" of marine mammals by
- 9 U.S. citizens on the high seas, and the importation of marine mammals and marine
- mammal products into the U.S. No marine mammals will be "taken" incidental to the
- 11 implementation of the Preferred Alternative. In addition, marine mammals are not
- 12 known to frequent the lagoon ecosystem. If marine mammals did inhabit the lagoon
- ecosystem they would benefit from the restorative impacts that the retention basins would
- provide. As a result, the proposed construction activities in this EA should not be a
- 15 concern regarding the MMPA.

# 16 4.8 MAGNUSON-STEVENS FISHERY CONSERVATION AND 17 MANAGEMENT ACT

- 18 The Magnuson-Stevens Fishery Conservation and Management Act was created in 1976
- and amended twice in 1996 and 2006. The Act was enacted to serve the following seven
- 20 purposes:

22

26

27

28

29

30

31

35

- acting to conserve fishery resources;
  - supporting enforcement of international fishing agreements;
- promoting fishing in line with conservation principles;
- providing for the implementation of fishery management plans which achieve optimal yield;
  - establishing Regional Fishery Management Councils to steward fishery resources through the preparation, monitoring, and revising of plans which enables stakeholders to participate in the administration of fisheries and consider social and economic needs:
  - developing underutilized fisheries; and
    - protecting essential fish habitats.
- 32 The detention basin proposed in this EA will serve to improve the lagoon ecosystem. As
- a result, the Preferred Alternative would have a beneficial impact on the local fishery
- 34 centered in the study area.

## 4.9 COASTAL RESOURCE MANAGEMENT ACT

- 36 This act requires that parties proposing anthropogenic activities affecting or which may
- 37 affect the coastal resources of the CNMI apply for a CRMO Permit. A wetland site
- 38 assessment conducted by CRMO personnel in November of 2003 found no evidence of
- 39 wetlands in the proposed detention basin site. No other Areas of Particular Concern
- 40 (APCs) were identified within the boundaries of the study area.

## 4.10 EXECUTIVE ORDER (EO) 13089 ON COASTAL REEF PROTECTION

- 2 EO 13089 directs all Federal agencies to protect and manage U.S. coral reef ecosystems
- 3 by identifying actions that may affect these ecosystems, and to protect and enhance them
- 4 to the extent permissible by law. As the objective of the project is to restore the
- 5 ecosystem of the lagoon, the Preferred Alternative would not adversely impact the
- 6 existing coral reef ecosystem and may enhance its condition over time.

## 7 4.11 SECTION 106 NATIONAL HISTORIC PRESERVATION ACT

- 8 Section 106 of the NHPA seeks to accommodate historic preservation concerns with the 9 needs of Federal endeavors through consultation among the agency official, CNMI
- Historic Preservation Officer, and other parties with an interest in the effects of the
- project on cultural, archaeological and historic resources and properties. The purpose of
- 12 consultation is to identify cultural, archaeological and historic resources and properties
- potentially affected by the project, assess its effects and seek ways to avoid, minimize or
- mitigate any adverse effects on known resources.

15 16

17

18

Pursuant to Section 106 of the NHPA of 1966 (as amended) and its implementing regulations (36 CFR 800), project alternatives which might affect properties listed or eligible for listing on the National Register of Historic Places are subject to the provisions of this Act.

19 20 21

22

23

24

25

26

27

28

29

30

31

32

33

34

35 36

37

38

39

USACE and CNMI Archeological staff had meetings and field visits pertaining to the study area as well as a formal archaeological investigation in August, 2003. Preferred Alternative would have no adverse effect to historic properties. However, prior to the start of any ground breaking construction activities associated with this project, an AMP shall be completed by a qualified archaeologist and submitted to the CNMI HPO for review and comments before its finalization prior to groundbreaking activities. Further, monitoring by a qualified archeologist is recommended for any earthmoving activities to ensure proper treatment of any possible subsurface historical, cultural and/or archeological resources encountered. A full archaeological report documenting the results of the archaeological monitoring activities shall also be submitted at the end of all construction activities to the CNMI HPO for the agency's library and files. Based on USACE POH Archaeological evaluation of the project area, it is concluded that the presence of a qualified archaeologist during construction will ensure the protection of potentially significant cultural resources including human burial remains that may be present subsurface within the project's area of potential effect. USACE POH has concluded that with the presence of a qualified archaeologist monitor during all new ground breaking construction activities as well as the submittal of a final AMP and postmonitoring archaeological report to CNMI HPO, a determination can be made that the Preferred Alternative shall have no adverse effect to historic properties.

September 2013

## 4.12 EO 12898 – ENVIRONMENTAL JUSTICE IN MINORITY POPULATIONS AND LOW-INCOME POPULATIONS AND EO 13045 – PROTECTION OF CHILDREN FROM ENVIRONMENTAL HEALTH AND SAFETY RISKS

- 4 EO 12898 states that "each Federal agency shall make achieving environmental justice 5 part of its mission by identifying and addressing, as appropriate, disproportionately high
- 6 and adverse human health or environmental impacts of its programs, policies, and
- 7 activities on minority populations and low-income populations in the United States and
- 8 its territories and possessions, the District of Columbia, the Commonwealth of Puerto
- 9 Rico, and the CNMI."

1

2 3

- 10 No significant adverse environmental impacts are anticipated as a result of the Preferred
- 11 Alternative. The Preferred Alternative involves a public infrastructure project to reduce
- the amount of sediment and other harmful constituents from reaching the Saipan lagoon.
- 13 There would be no significant adverse impacts to minority and low-income populations
- 14 in Saipan. No disproportionate adverse effects on children are expected to result from
- implementation of the Preferred Alternative. The Preferred Alternative would result in
- beneficial impacts to public health and safety, and the environment.

September 2013

This page is intentionally left blank.

1	5. LIST OF PREPARERS
2	Sonia Shjegstad, Project Manager, Environet Inc.
3	B.S. Biology; Environmental Science and Policy, Duke University.
4	M.S. Biology, University of Guam
5	Colette Sakoda, Senior Environmental Planner, Environet, Inc.
6	M.C.P. City and Regional Planning, University of California at Berkeley
7	Matt Neal, Environmental Scientist, Environet Inc.
8	B.S. Environmental Science
9	Steven Spengler, Senior Scientist, Environet Inc.
10	Ph.D. Hydrogeology
11	M.S. Geochemistry
12	B.S. Geology
13	B.S. Chemistry
14	Miya Akiba, Environmental Scientist, Environet Inc.
15	B.S. Global Environmental Science
16	Max Solmssen, Environmental Scientist, Environet Inc.
17	M.S. Urban and Regional Planning (Pending)
18	
19	

September 2013

This page is intentionally left blank.

6. REFERENCES

- Bowers, Neal M., 2001. *Problems of Resettlement on Saipan, Tinian, and Rota.* 2<sup>nd</sup> Edition. Saipan: N.M.I Division of Historic Preservation.
- Butler, B. and D.G. De Fant, 1991. Archaeological Survey on the Leeward Coast of
   Saipan: Garapan to Oleai. Micronesian Archaeological Survey Report Number
   July, 1991.
- 7 Cavanaugh and Tocci. 1998. Environmental Noise, the Invisible Pollutant. 8 Environmental Excellence in South Carolina. Volume 1, Number 1, USC Institute 9 of Public Affairs. Available at:
- 10 http://www.cavtocci.com/portfolio/publications/EnvironmentalNoise.pdf
- 11 CEQ, 2010. Memorandum for Heads of Federal Departments and Agencies. *Draft*12 *NEPA Guidance on Consideration of the Effects of Climate Change and*13 *Greenhouse Gas Emissions*. February 18.
- 14 Cloud, D.E., Jr., R.G. Schmidt, and H.W. Burke, 1956. *Geology of Saipan, Mariana Islands*, USGS, Prof. Paper, 1350:5-54.
- 16 CNMI, 2008. *Saipan Zoning Law of 2008*. Commonwealth of the Northern Mariana 17 Islands Saipan and Northern Islands Legislative Delegation, Enacted: November 18 12, 2008.
- Community Planning & Engineering, Inc, 2012. Preliminary Drainage Design for Aquatic Ecosystem Restoration Study, Saipan Lagoon, Saipan, Northern Mariana Islands. January.
- DEQ, 2002. CNMI Water Quality Assessment 305(b) Report, 2002.
- DEQ, 2010. Commonwealth of the Northern Mariana Islands Integrated 305(b) and 303 (d) Water Quality Assessment Report. November.
- DLNR, 1989. Commonwealth of the Northern Mariana Islands Wetlands Conservation Priority Plan, An Addendum to the 1985 Statewide Comprehensive Outdoor Recreational Plan.
- DLNR, 1998. Summary and Further Analysis of the Nearshore Reef Fishery of the Northern Mariana Islands. Federal Aid in Sportfish Restoration Act Project F-1-R-15, Tech. Report 98-02.
- 31 Environet, 2001. Phase I, Saipan Lagoon Aquatic Ecosystem Restoration Project.
- 32 Consulting report prepared for the United States Army Corps of Engineers,
- Honolulu Engineering District, Contract No. DACA83-03-D-0037, dated June, 2001.
- Environet, 2003. Rainfall-Frequency Study, Saipan, Commonwealth of Northern
- Marianas Islands. Report prepared for the U.S Army Corps of Engineers, dated April 2003.

- Environet, 2013. Pre-Draft Environmental Restoration Report, Saipan Lagoon Aquatic Ecosystem Restoration Project. Report prepared for the U.S. Army Corps of Engineers, dated January, 2013.
- 4 EPA, 1977. *Toward a National Strategy for Noise Control*. U.S. Environmental Protection Agency, April 1977.
- 6 Farrell, D, 1991. The History of the Northern Mariana Islands. CNMI Public School System. 1991.
- 8 FEMA. 2012. http://www.fema.gov/. Accessed November, 2012.
- Hoffmann, J.P., Carruth, R.L., and Meyer, William, 1998. Geology, groundwater
   occurrence, and estimated well yields from the Mariana Limestone, Kagman area,
   Saipan, CNMI. USGS Water Resources Investigations Report 98-4077, 38p.
- Houk, 1999. State of the reef report for 5 sites on Rota Island, CNMI. CNMI DEQ unpublished report.
- Houk, 2000. State of the reef report for Saipan Island, CNMI. CNMI DEQ unpublished
   report.
- Houk, P. and R. Camacho, 2010. Dynamics of seagrass and macroalgal assemblages in
   Saipan Lagoon, Western Pacific Ocean: disturbances, pollution, and seasonal
   cycles. Botanica Marina 53: 205-212.
- Houk, P., 2010. Market-based Fish Surveys: A wealth of information for Micronesia, but are we applying the knowledge. Journal of Micronesian Fishing. Spring Issue: 10-13.
- Karig, D.E., 1971. Origin and Development of Marginal basins in the Western Pacific. J.
   Geophys. Res., 76:2542-2561.
- Meijer, A., Reagan, M., Ellis, H., Shafiqullah, M., Sutter, J., Damon, P., and Kling, S., 19831982. Chronology of volcanic events in the eastern Philippine Sea in Hayes, D.E. (ed.). The tectonic and geologic evolution of southeast Asian seas and islands: Part 2: Geophysical Monograph 27, American Geophysical Untion, P.

28 349-359.

- NOAA, 2012. ESA Status Review of 82 Coral Species. Accessed at: http://sero.nmfs.noaa.gov/pr/esa/82CoralSpecies.htm. October 25, 2012
- United States Occupational Safety and Health Administration, 2012. 29 CFR, Part 1910,
   Subpart: G: Occupational Safety and Health Standards.
- Spoehr, A., 2000. Saipan: The Ethnology of a War-Devastated Island. Saipan: Division of Historic Preservation (Second Edition).
- Starmer, et al., 2008. The State of Coral Reef Ecosystems of the Commonwealth of the Northern Mariana Islands. In: Ed. Waddell (ed.). The State of Coral Reef Ecosystems of the United States and Pacific Freely Associated States: 2005.
- NOAA Tech.Mem. NOS NCCOS 11, Silver Spring, MD.
- 39 USACE. Planning Guidance Notebook, ER 1105-2-100. 22 April 2000.

- 1 US Army. Environmental Protection and Enhancement, AR 200-1.
- 2 USFWS, 1989. U.S. Fish & Wildlife Service (1989b). Island of Saipan. National Wetlands Inventory. U.S. Fish & Wildlife Service, Pacific Region, Portland, Oregon. (Map).
- 5 USFWS, 2011. Guam and Commonwealth of the Northern Mariana Islands Animals & Plants: listed species, as designated under the U.S. Endangered Species Act.
- February 2, 2011. Accessed at:
- 8 http://www.fws.gov/pacificislands/Publications/GuamandCommonwealth of the
- 9 Northern Mariana Islands Animals\_ListedSpp.pdf
- USGS. Summary of Hydrologic Data for 1998, Saipan, Commonwealth of the Northern
   Mariana Islands. USGS, Open-File report 00-301, 39 pp. 2000b.
- Van der Brug, O., 1985. Compilation of water resources development and hydrologic data of Saipan, Mariana Islands. Water Resources Investigation Report, 84-4121.
- WRC, 1983. Principles and Guidelines for Water Resources and Land Conservation Implementation Studies. Adopted by the WRC (48FR 10250) in 1983.
- Young, Fred J., 1989. Soil Survey of the Islands of Aguijan, Rota, Saipan, and Tinian,
   Commonwealth of the Northern Mariana Islands. July 1989.

September 2013

This page is intentionally left blank.

Appendix A
Preliminary Drainage Design Report

# PRELIMINARY DRAINAGE DESIGN FOR AQUATIC ECOSYSTEM RESTORATION STUDY SAIPAN LAGOON SAIPAN, NOTHERN MARIANA ISLANDS

Prepared for:
U.S Army Corps of Engineers
Honolulu District
&
Environet Inc.

Prepared by: Community Planning & Engineering, Inc. 1100 Alakea, Sixth Floor Honolulu, HI 96813

January 2012

# Table of Contents

Section 1 Hydrology	1-1
Section 2 Hydraulics	2-1
Section 3 Quartermaster Site	3-1
3.1 2-Year Storm Event	3-1
3.2 5-Year Storm Event	
3.3 10-Year Storm Event	
Section 4 China House Site	4-1
4.1 2-Year Storm Event	4-1
4.2 5-Year Storm Event	
4.3 10-Year Storm Event	4-2
Section 5 Cock Fight Arena Site	5-1
5.1 2-Year Storm Event.	5-1
5.2 5-Year Storm Event	
5.3 10-Year Storm Event.	5-2
Section 6 Conclusion	6-1
Section 7 References	6-1
List of Figures	1
Overall Plan and Key Map	
Quarter Master Site	2
2-Year Storm Event Preliminary Design	
5-Year Storm Event Preliminary Design	
10-Year Storm Event Preliminary Design	2.3
China House Site	3
2-Year Storm Event Preliminary Design	3.1
5-Year Storm Event Preliminary Design	3.2
10-Year Storm Event Preliminary Design	3.3
Cock Fight Arena Site	4
2-Year Storm Event Preliminary Design	4.1
5-Year Storm Event Preliminary Design	4.2
10-Year Storm Event Preliminary Design	4 3

# Appendix A

Quartermaster Site	A-1
2-Year Storm Event	A-1
5-Year Storm Event	
10-Year Storm Event	
China House Site	A-13
2-Year Storm Event	A-13
5-Year Storm Event	A-17
10-Year Storm Event	A-21
Cock Fight Arena Site	A-25
2-Year Storm Event.	A-25
5-Year Storm Event	A-29
10-Year Storm Event.	

# Section 1 Hydrology

Three low-lying areas in the West Takapochao watershed were selected for evaluation as possible drainage detention basins. These sites include vacant land adjacent to Quartermaster Road, the China House, and the Cockfight Arena; see Figure 1. These three areas currently flood during heavy rains.

During heavy rains the initial rainfall will produce the most sediment, nutrients and pollutants, known as the "first flush." In order to represent this "first flush" a one-hour intensity storm over a one hour duration has been applied to the analyses. Three storm events were evaluated in this report; 2-year, 5-year, and 10-year recurrence storms. Storm event data were utilized from the "Rainfall – Frequency Study, Saipan Commonwealth of Northern Marianas Islands, Contract No. DACA83-01-D-0014", prepared by Environet, Incorporated, dated April 2003.

Table 1: Saipan International Airport Rainfall Data – 60 minute Duration Storm Events

Return Frequency	Cumulative Rainfall (inches)	Rainfall Intensity (inches/ hour) <sup>1</sup>
V	3.06	3.06
$f X_{10}$	3.00	3.00
Λ <sub>5</sub>	1.02	2.01
$X_2$	1.93	1.93

1 From Table 4-6 and Table 4-7 in the "Rainfall – Frequency Study"

The watershed analysis for each storm and site was performed using the computer software program Hydrologic Modeling System HEC-HMS, version 3.5 and can be found in Appendix A. The Soil Conservation Service (now the Natural Resource Conservation Service) curve number was applied to the analyses along with the SCS unit hydrograph to symbolize the direct runoff over the watersheds. The lag time for the unit hydrograph was assumed to equal the time of concentration. No baseflow is assumed in the analyses. The simulations were ran over a 24-hour time period.

# Section 2 Hydraulics

HEC-HMS version 3.5 was also used to perform the analysis on the proposed detention basins. Elevation-area functions were used to specify the storage relationships. The outlet structure routing method was used to perform the reservoir routing. The simulations were routed through reinforced concrete outlet pipes (RCP) that were sized according to the analysis and existing site conditions. The RCP outlet pipes are to be wrapped in filter cloth and gravel, and are to be located 1'-2' above the bottom of the detention basin. This will allow sediment to settle out in the basin and will require periodic removal of sediment from the basins. The simulations were ran over a 24-hour time period.

Each watershed was analyzed separately for the three storm events. A preliminary design of the required improvements was completed for each event and each site. The preliminary designs are further explained in detail in the following sections. Each design is based upon 100% of the design storm runoff passing through the detention basin. The analysis assumes that the topographic conditions and existing drainage facilities adequately convey storm flows to the proposed detention basins. Detailed as-built information and condition surveys about existing storm drain systems were not available; nor were detailed surveys of the proposed sites. This information will be necessary for implementation of the final design of the proposed detention basins. For the purposes of preliminary design and comparison, assumptions were made regarding the sites and existing drain systems. These assumptions are identified in the following sections and/or on the figures. It should also be noted that the Quartermaster Site and the Cock Fight Arena are currently on private property. This report does not address acquiring such properties and that it is assumed that all lands used for the proposed detention basins can or will be acquired by the CNMI Government.

# Section 3 Quartermaster Site

## 3.1 Existing Conditions

The Quartermaster Site is located at the northwest corner of the intersection of Quartermaster Road and Middle Road. The site is currently vacant and overgrown with vegetation. The site generally slopes to the southwest corner at approximately 4-5%.

The watershed which is tributary to the site is approximately 109 acres. The wtershed is mostly undeveloped, mountainous terrain. The bottom of the watershed, adjacent to Middle Road is more moderately sloped and developed with residential and commercial buildings, roads, and associated improvements. The watershed has an average slope of approximately 23%.

The storm runoff concentrates along the east side of Middle Road at a low point on the northern side of the Quartermaster Road intersection. There is an existing catch basin at this location which will continue to be utilized.

Condition of existing drainage facilities is unknown and may require repair or replacement. Existing facilities were assumed as shown on figures 2.1, 2.2 and 2.3.

## 3.2 2-Year Storm Event

The 2-year storm event will produce a peak runoff of approximately 20.8 cfs. The runoff will be routed through a proposed detention basin providing approximately 1.52 ac-ft of storage from elevations 23 feet - 32 feet. Discharge from the detention basin will enter an existing swale via an 18 inch RCP outlet and flow along the north side of Quartermaster Road running westward toward Beach Road and the Lagoon. Figure 2.1 depicts the required improvements to the Quartermaster site to detain the 2-year storm event. With the proposed improvements, the detention basin will pond approximately to elevation 26.8 feet, and the peak discharge from the detention basin will be approximately 7.7 cfs.

## 3.3 5-Year Storm Event

The 5-year storm event will produce a peak runoff of approximately 75.0 cfs. The runoff will be routed through a proposed detention basin providing approximately 4.89 ac-ft of storage from elevations 23 feet – 32 feet. Discharge from the detention basin will enter an existing swale via an 18 inch RCP outlet and flow along the north side of Quartermaster Road running westward toward Beach Road and the Lagoon. Figure 2.2 depicts the required improvements to the Quartermaster site to detain the 5-year storm event. With the proposed improvements, the detention basin will pond approximately to elevation 27.9 feet, and the peak discharge from the detention basin will be approximately 12.4 cfs.

## 3.4 10-Year Storm Event

The 10-year storm event will produce a peak runoff of approximately 118.5 cfs. The runoff will be routed through a proposed detention basin providing approximately 6.92 ac-ft of storage from elevations 23 feet – 32 feet. Discharge from the detention basin will enter an existing swale via an 18 inch RCP outlet and flow along the north side of Quartermaster Road running westward toward Beach Road and the Lagoon. Figure 2.3 depicts the required improvements to the Quartermaster site to detain the 10-year storm event. With the proposed improvements, the detention basin will pond approximately to elevation 28.9 feet, and the peak discharge from the detention basin will be approximately 14.5 cfs.

## Section 4 China House Site

## 4.1 Existing Conditions

The China House Site is located near the China House Restaurant and the driving range, about halfway between Middle Road and Beach Road. The site is currently undeveloped and overgrown with vegetation. However there are abandoned structures on the property which will need to be demolished. The site generally slopes to the west at approximately 3.5%.

The watershed which is tributary to the site is approximately 344 acres. The watershed is mixed between undeveloped, mountainous terrain and areas developed with residential and commercial buildings, roads, and associated improvements. The watershed has an average slope of approximately 16%.

The storm runoff concentrates along the east side of Middle Road at a low point in the road. There is an existing catch basin at this location which will continue to be utilized. Each storm event requires improvements starting at this existing catch basin, which are further detailed in the following sections.

Condition of existing drainage facilities is unknown and may require repair or replacement. Existing facilities were assumed as shown on figures 3.1, 3.2 and 3.3.

## 4.2 2-Year Storm Event

The 2-year storm event will produce a peak runoff of approximately 51.9 cfs. The runoff will be routed through a proposed detention basin providing approximately 4.77 ac-ft of storage from elevations 20 feet – 29 feet. An 18 inch RCP outlet will discharge from the detention basin to an existing double 30 inch culvert under Beach Road, discharging to the Lagoon. Figure 3.1 depicts the required improvements to the China House site to detain the 2-year storm event. With the proposed improvements, the detention basin will pond approximately to elevation 24.4 feet, and the peak discharge from the detention basin will be approximately 15.0 cfs.

## 4.3 5-Year Storm Event

The 5-year storm event will produce a peak runoff of approximately 178.6 cfs. The runoff will be routed through a proposed detention basin providing approximately 13.54 ac-ft of storage from elevations 19 feet – 29 feet. An 18 inch outlet pipe will discharge from the detention basin to an existing double 30 inch culvert under Beach Road, discharging to the Lagoon. Figure 3.2 depicts the required improvements to the China House site to detain the 5-year storm event. With the proposed improvements, the detention basin will pond approximately to elevation 26.8 feet, and the peak discharge from the detention basin will be approximately 15.6 cfs.

## 4.4 10-Year Storm Event

The 10-year storm event will produce a peak runoff of approximately 284.0 cfs. The runoff will be routed through a proposed detention basin providing approximately 15.84 ac-ft of storage from elevations 18 feet – 30 feet. A 36 inch outlet pipe will discharge from the detention basin to an existing double 30 inch culvert under Beach Road, then discharging to the Lagoon. Figure 3.3 depicts the required improvements to the China House site to detain the 10-year storm event. With the proposed improvements, the detention basin will pond approximately to elevation 27.9 feet, and the peak discharge from the detention basin will be approximately 91.1 cfs.

# Section 5 Cock Fight Arena Site

## 5.1 Existing Conditions

The Cock Fight Arena Site is located on the east side of Middle Road, surrounding the existing Cock Fight Arena. The site is currently developed as a Cock Fight Arena, and portions were utilized as a quarry. The site generally slopes to the quarry pit.

The watershed which is tributary to the site is approximately 413 acres. The watershed is mainly undeveloped, mountainous terrain with some minor areas developed with residential and commercial buildings, roads, and associated improvements. The watershed has an average slope of approximately 12%.

Condition of existing drainage facilities is unknown and may require repair or replacement. Existing facilities were assumed as shown on figures 4.1, 4.2 and 4.3.

## 5.2 2-Year Storm Event.

The 2-year storm event will produce a peak runoff of approximately 20.9 cfs. The runoff will be routed through a proposed detention basin providing approximately 11.85 ac-ft of storage from elevations 37 feet – 45 feet. An 18 inch outlet pipe will discharge from the detention basin to the Lagoon following existing paved roadways. Figure 4.1 depicts the required improvements to the Cock Fight Arena site to retain the 2-year storm event. The pit is currently sufficiently sized to accommodate the 2-year storm event; however, inlet improvements are required and outlet improvements are recommended. With the proposed improvements, the detention basin will pond approximately to elevation 40.3 feet, and the peak discharge from the detention basin will be approximately 4.4 cfs.

Based upon the minimal topographic information provided, it appears that the Cock Fight Arena's finish floor is approximately 43 feet in elevation. Additional investigation of the Arena and the pit should be performed to verify that ponding will not flood the Arena.

## 5.3 5-Year Storm Event

The 5-year storm event will produce a peak runoff of approximately 95.9 cfs. The runoff will be routed through a proposed detention basin providing approximately 11.85 ac-ft of storage from elevations 37 feet – 45 feet. An 18 inch outlet pipe will discharge from the detention basin to the Lagoon following existing paved roadways. Figure 4.2 depicts the required improvements to the Cock Fight Arena site to detain the 5-year storm event. The pit is currently sufficiently sized to accommodate the 5-year storm event; however, inlet and outlet improvements are required. With the proposed improvements, the detention basin will pond approximately to elevation 43.4 feet, and the peak discharge from the detention basin will be approximately 14.0 cfs.

Based upon the minimal topographic information provided, it appears that the Cock Fight Arena's finish floor is approximately 43 feet in elevation. Additional investigation of the Arena and the pit should be performed to verify that ponding will not flood the Arena. If flooding will occur, modifications can be made to the pit, or outlet structures. Alternatively, the Arena may be demolished.

## 5.4 10-Year Storm Event.

The 10-year storm event will produce a peak runoff of approximately 164.7 cfs. The runoff will be routed through a proposed detention basin providing approximately 14.23 ac-ft of storage from elevations 37 feet – 45 feet. A 24 inch outlet pipe will discharge from the detention basin to the Lagoon following existing paved roadways. Figure 4.3 depicts the required improvements to the Cock Fight Arena site to detain the 10-year storm event. Improvements to the pit will include some grading at the base of the existing pit, the walls of the pit and limits of the pit will not require expansion. In addition, inlet and outlet improvements are required. With the proposed improvements, the detention basin will pond approximately to elevation 44.6 feet, and the peak discharge from the detention basin will be approximately 30.3 cfs.

Based upon the minimal topographic information provided, it appears that the Cock Fight Arena's finish floor is approximately 43 feet in elevation. Additional investigation of the Arena and the pit should be performed to verify whether ponding will flood the Arena. It appears likely that the Arena will need to be demolished, or additional modifications will need to be made to the pit, or outlet structures.

## Section 6 Conclusion

For each of the alternatives the detention basins were designed to provide adequate storage, detention times and outlet design to reduce outflow and improve water quality.

In addition to the detention basins, each site will include a perimeter fence and a paved access driveway to the bottom of each basin for safety and maintenance.

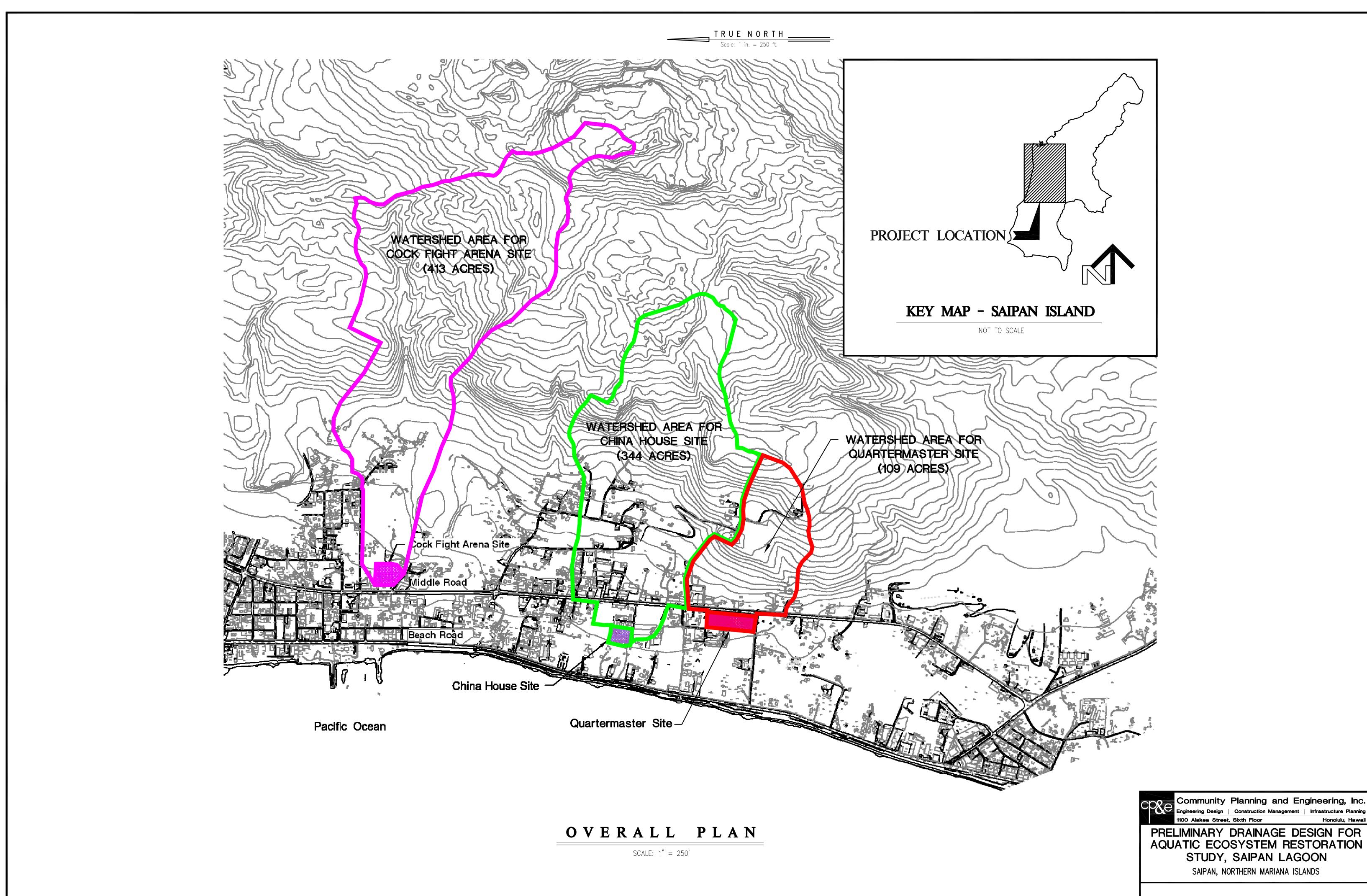
Additional topographic information will be required to finalize actual designs for any selected sites. Condition assessments of existing drainage facilities should also be performed.

The analysis provided herein along with the preliminary designs proposed, provide the U.S. Army Corps of Engineers (USACOE) with information to prepare cost-benefit analysis of the proposed sites and each of the storm event situations.

# Section 7 References

EI, 2003. Rainfall-Frequency Study, Saipan, Commonwealth of Northern Marianas Islands. Report prepared for U.S. Army Corps of Engineers, dated April 2003.

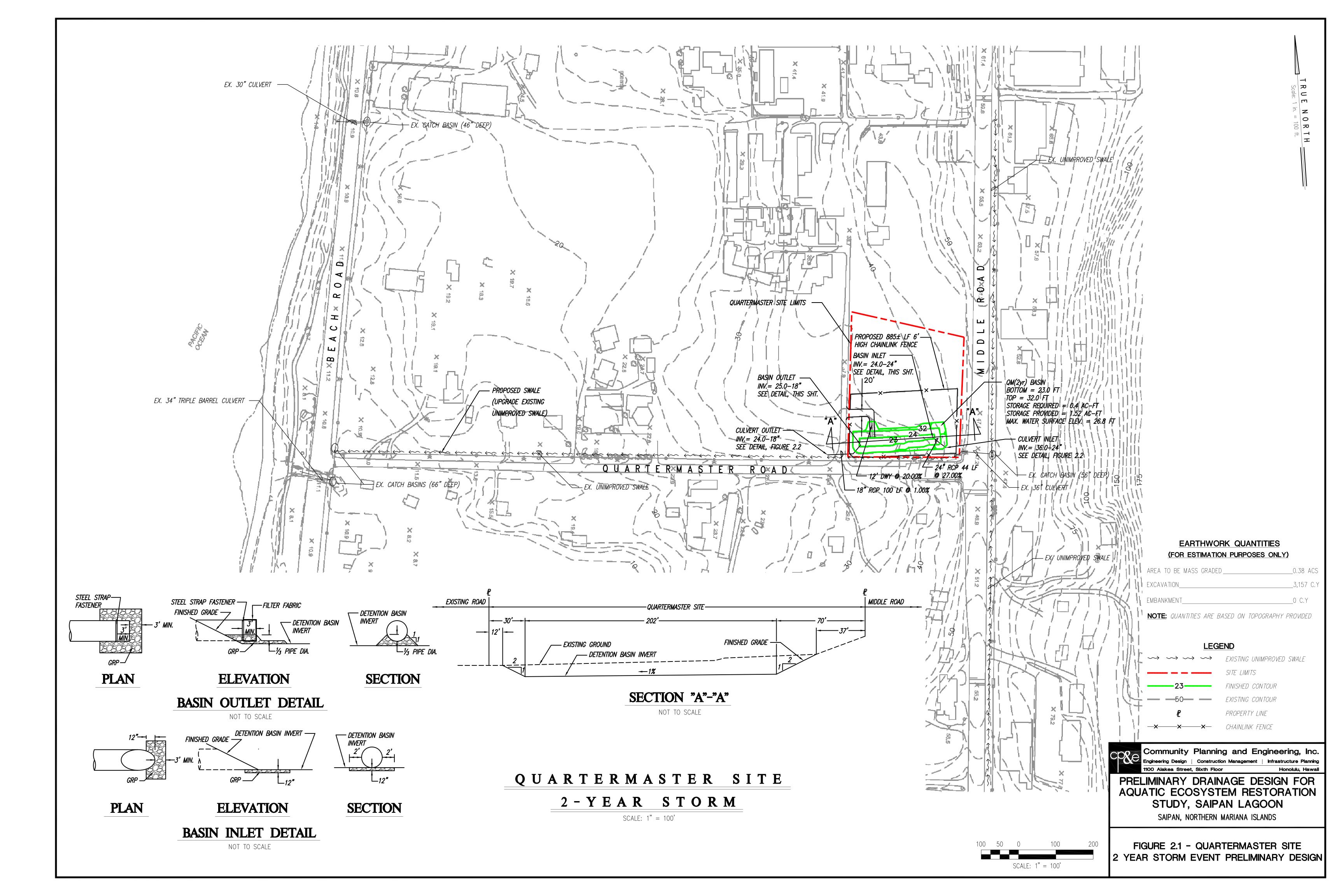


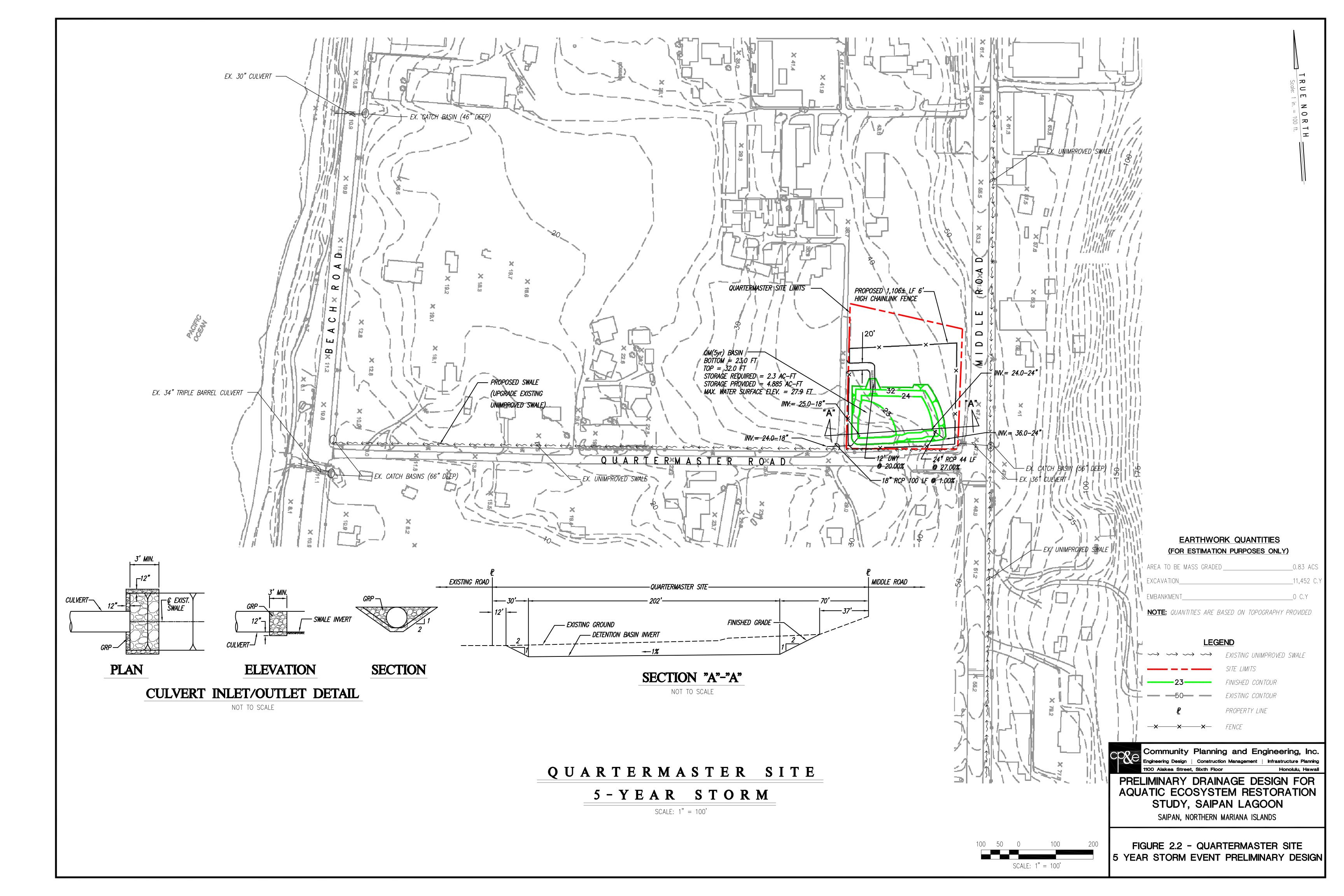


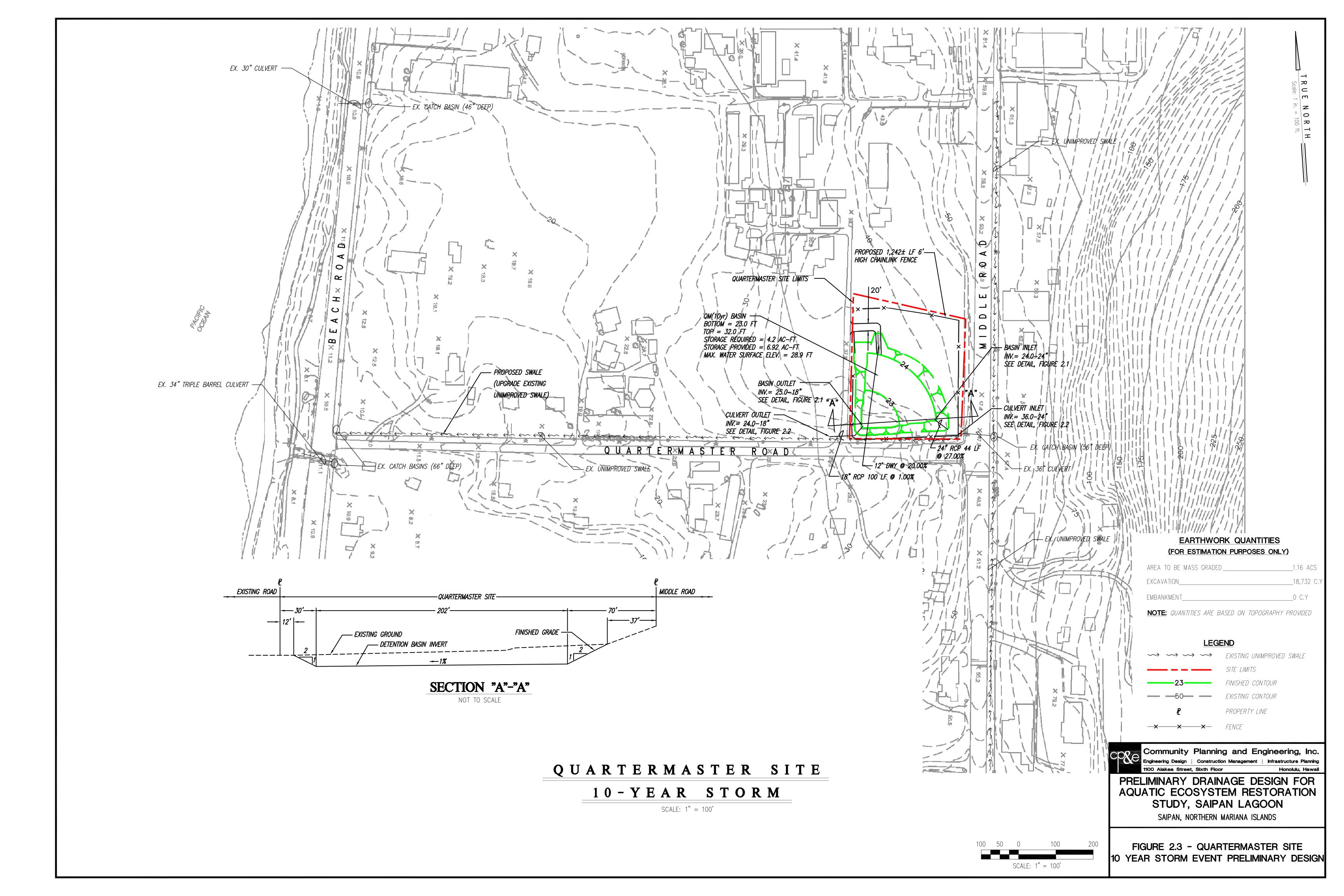
SCALE: 1" = 250'

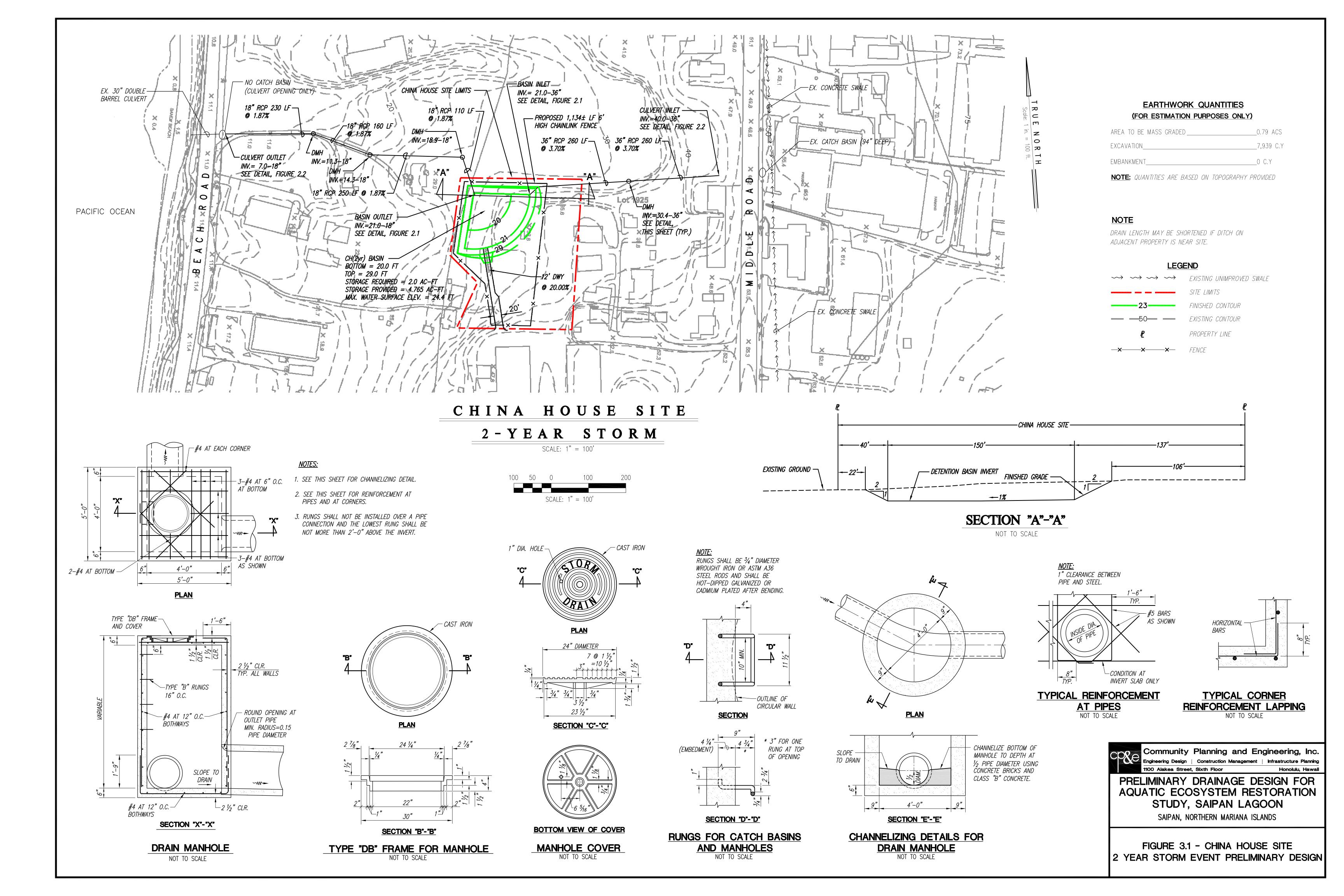
Engineering Design | Construction Management | Infrastructure Planning
1100 Alakea Street, Sixth Floor Honolulu, Hawaii

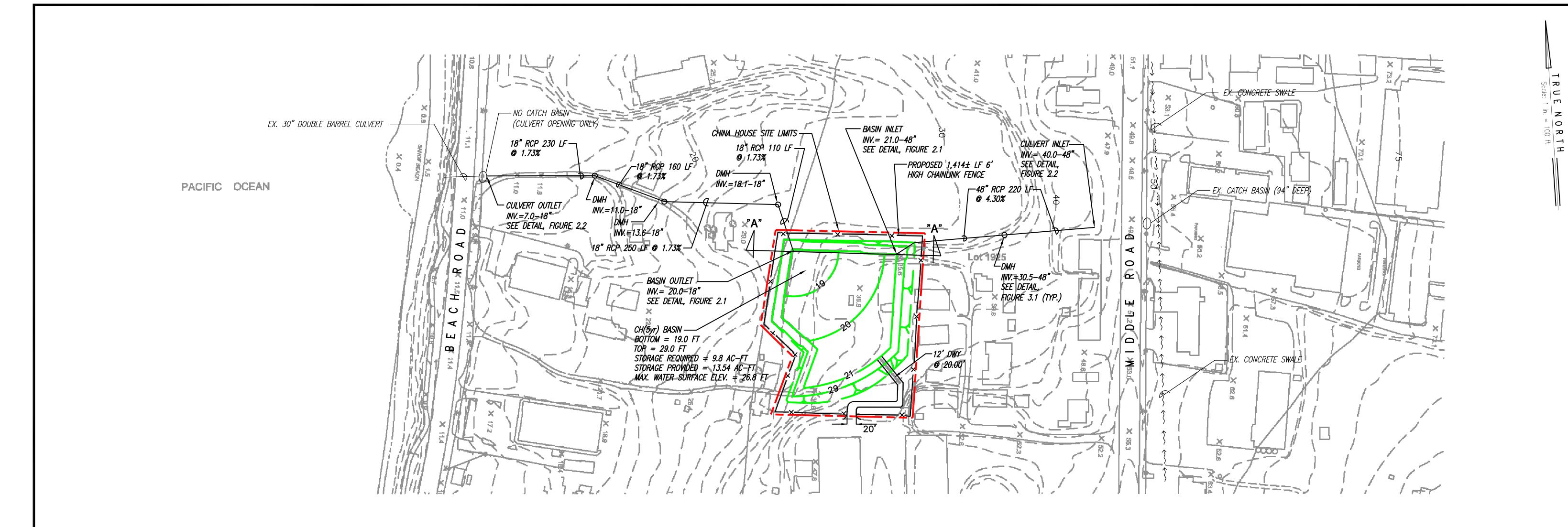
FIGURE 1 - OVERALL PLAN AND KEY MAP

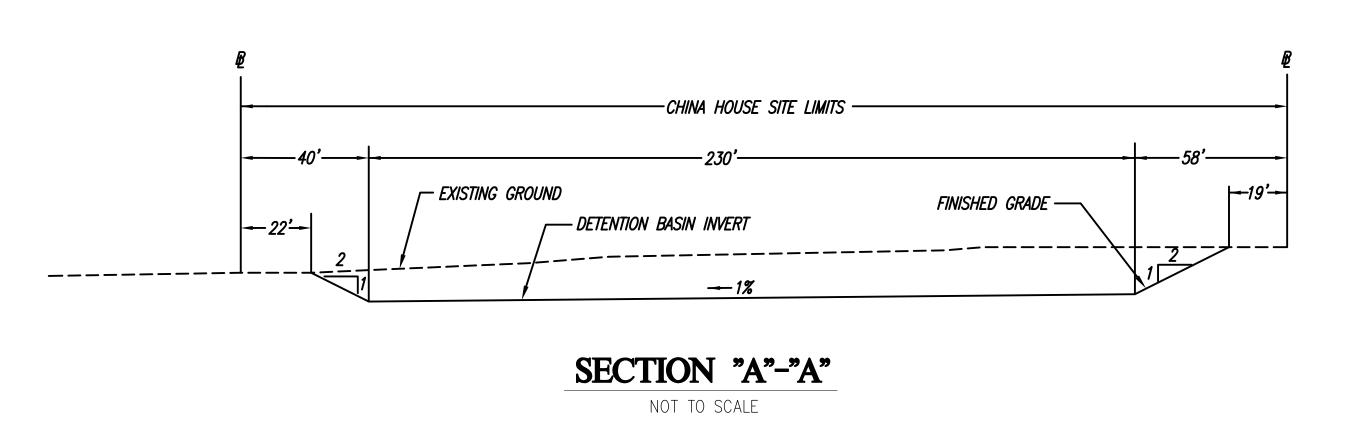




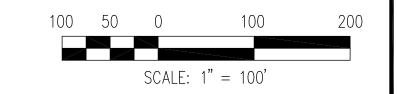








# CHINA HOUSE SITE 5-YEAR STORM SCALE: 1" = 100'



## EARTHWORK QUANTITIES (FOR ESTIMATION PURPOSES ONLY)

NOTE: QUANTITIES ARE BASED ON TOPOGRAPHY PROVIDED

## **NOTE**

DRAIN LENGTH MAY BE SHORTENED IF DITCH ON ADJACENT PROPERTY IS NEAR SITE.

## **LEGEND**

Community Planning and Engineering, Inc.

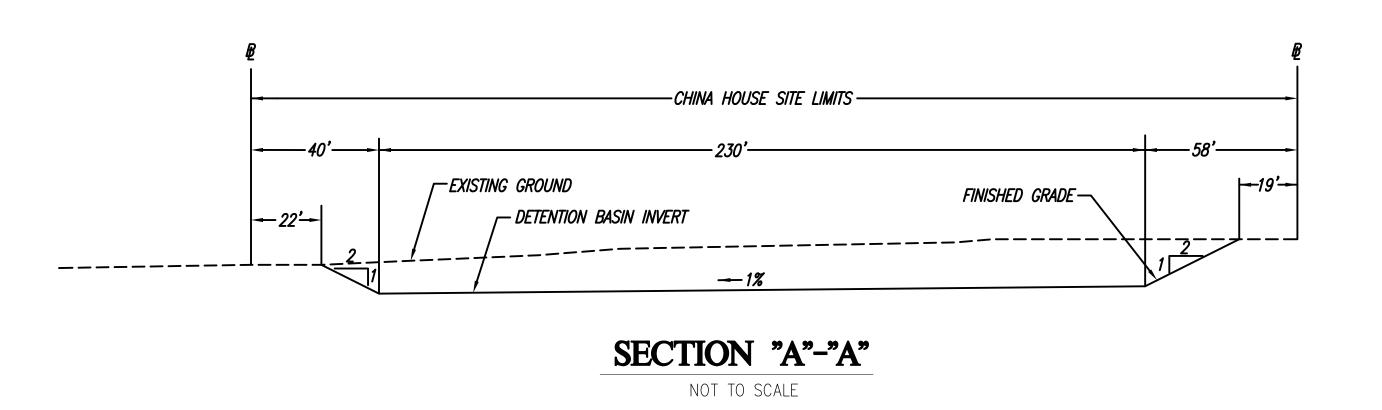
Engineering Design | Construction Management | Infrastructure Planning
1100 Alakea Street, Sixth Floor Honolulu, Hawaii

PRELIMINARY DRAINAGE DESIGN FOR AQUATIC ECOSYSTEM RESTORATION STUDY, SAIPAN LAGOON

SAIPAN, NORTHERN MARIANA ISLANDS

FIGURE 3.2 - CHINA HOUSE SITE 5 YEAR STORM EVENT PRELIMINARY DESIGN





# CHINA HOUSE SITE 10-YEAR STORM

SCALE: 1" = 100'

## EARTHWORK QUANTITIES (FOR ESTIMATION PURPOSES ONLY)

**Z O** 

NOTE: QUANTITIES ARE BASED ON TOPOGRAPHY PROVIDED

## **NOTE**

DRAIN LENGTH MAY BE SHORTENED IF DITCH ON ADJACENT PROPERTY IS NEAR SITE.

## **LEGEND**

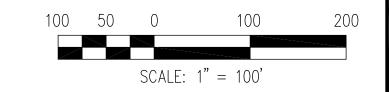
Community Planning and Engineering, Inc.

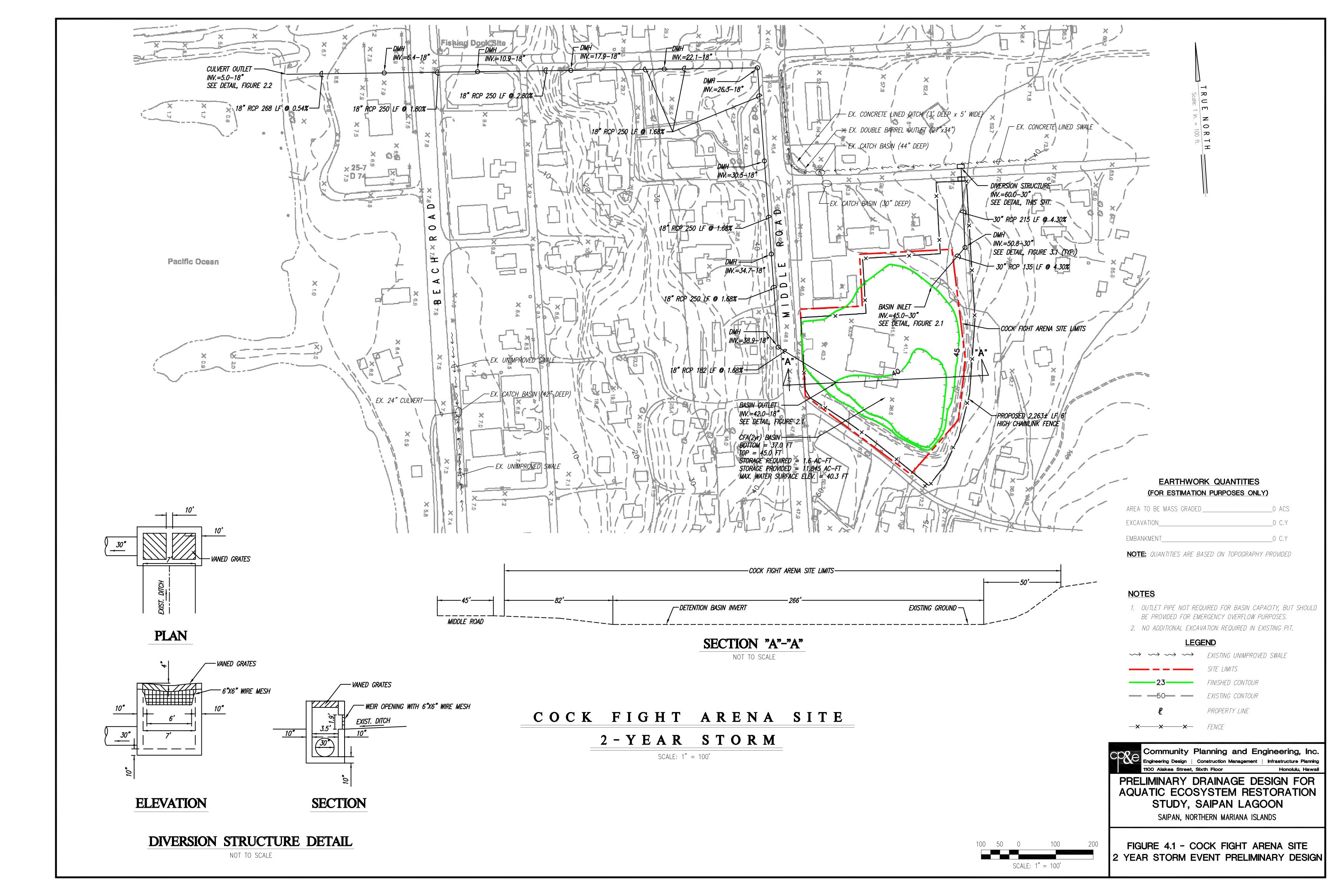
Engineering Design | Construction Management | Infrastructure Planning
1100 Alakea Street, Sixth Floor Honolulu, Hawali

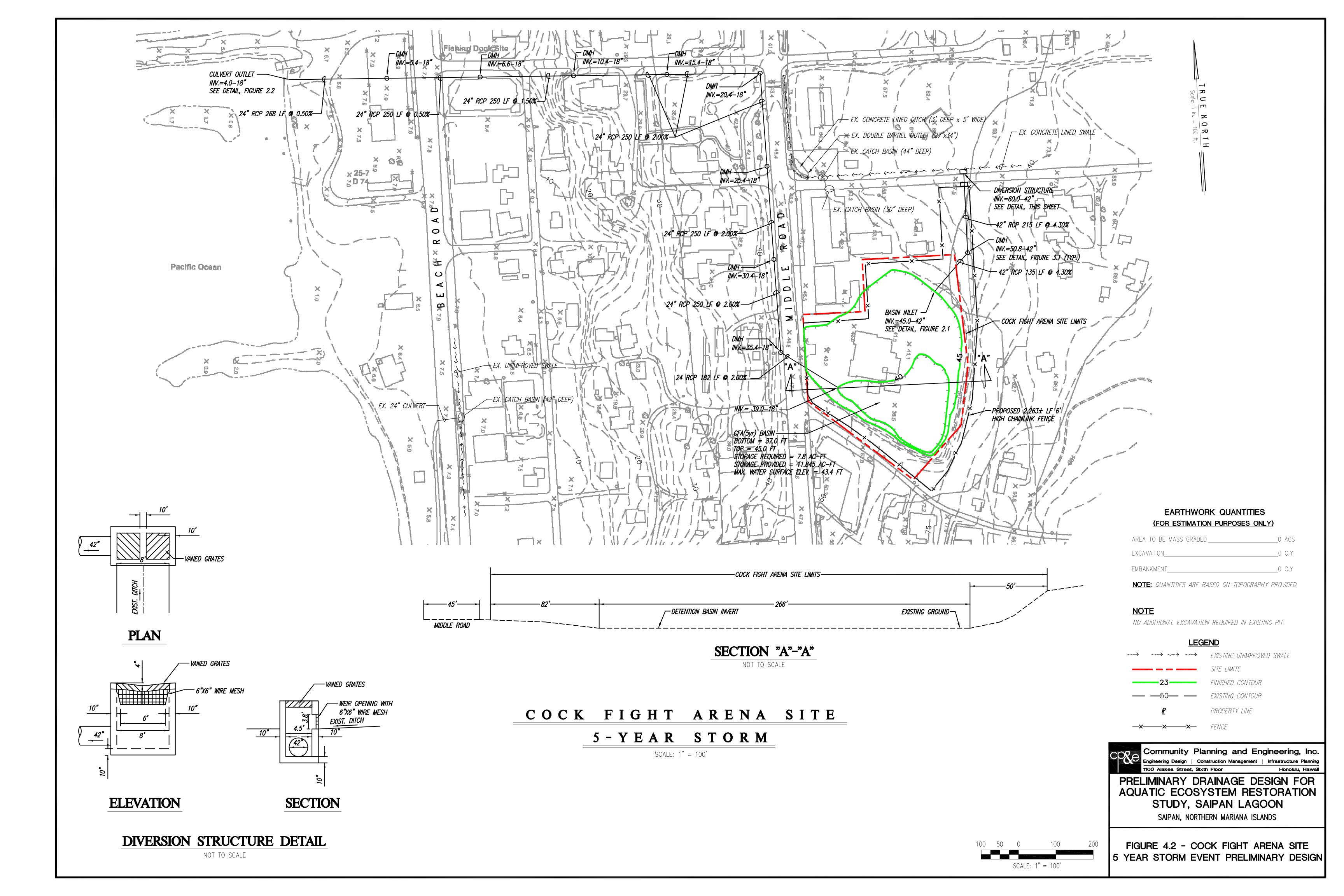
PRELIMINARY DRAINAGE DESIGN FOR AQUATIC ECOSYSTEM RESTORATION STUDY, SAIPAN LAGOON

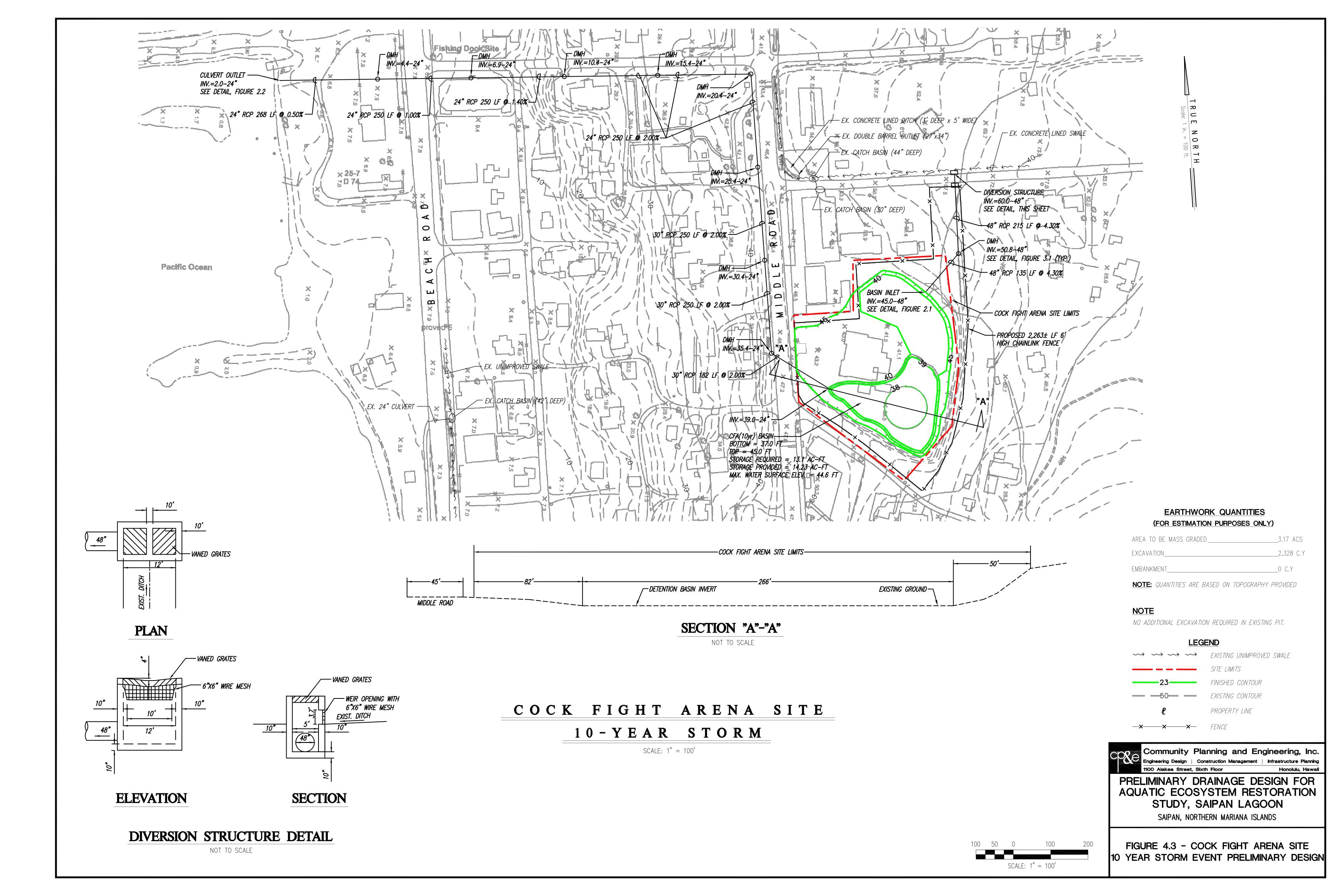
SAIPAN, NORTHERN MARIANA ISLANDS

FIGURE 3.3 - CHINA HOUSE SITE
10 YEAR STORM EVENT PRELIMINARY DESIGN









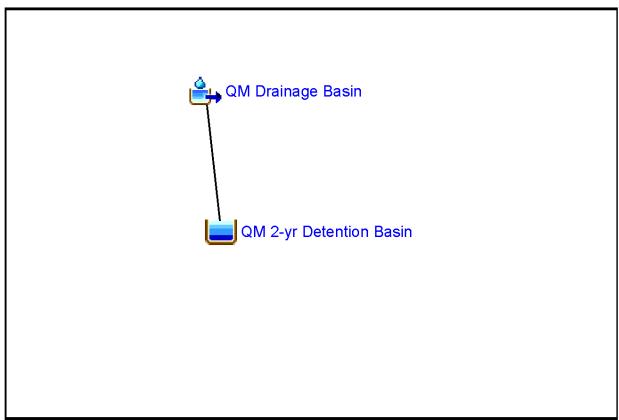
# Appendix A

## 1. Quartermaster Site: 2-Year Storm Event



## **Project: Saipon Lagoon Restoration**

Basin Model: Quarter Master 2-yr Storm Dec 27 14:11:52 HST 2011



## A. Quartermaster Drainage Basin:

#### A.1 Basin Model:

Area: 109 ac (0.1703 mi<sup>2</sup>)

CN: 65

Tc: 10.7 min Rainfall 2-year/1 hour: 1.93 in

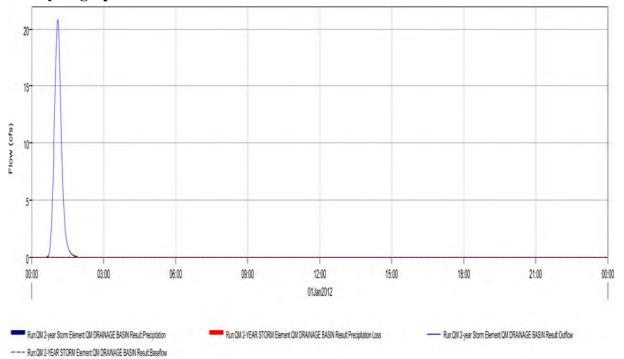
Loss Method: SCS Curve Number Transform Method: SCS Unit Hydrograph

#### **A.2 HEC-HMS Simulation Results:**

Simulation Run: QM 2-year Storm
Subbasin: QM Drainage Basin
Meteorologic Model: 2-year / 1 hour Storm
Control Specification: Control -24-hour

Computed Results			
Peak Discharge:	<b>20.8</b> (cfs)	Time of Peak Discharge:	01:06
Total Precipitation:	15.4 (ac-ft)	<b>Total Direct Runoff:</b>	0.6 (ac-ft)
Total Loss:	14.8 (ac-ft)	Total Baseflow:	0.0 (ac-ft)
<b>Total Excess:</b>	0.6 (ac-ft)	Discharge:	0.6 (ac-ft)

#### A3. Hydrograph



## **B. Quartermaster 2-Year Detention Basin:**

#### **B.1 Detention Basin Design:**

Elevation (ft)	Surf. Area (ac)	Increment Storage (ac-ft)	Cumulative Storage (ac-ft)
23.00	0.050	0.000	0.000
24.00	0.090	0.070	0.070
25.00	0.110	0.100	0.170
26.00	0.130	0.120	0.290
28.00	0.180	0.310	0.600
30.00	0.230	0.410	1.010
32.00	0.280	0.510	1.520

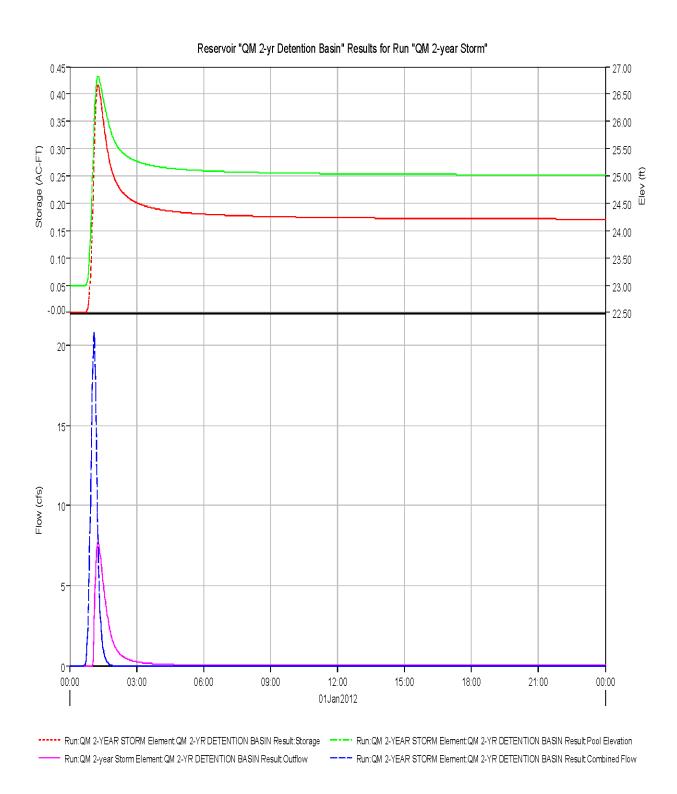
#### **B.2 Outlet Design:**

Pipe:	RCP culvert (end-section conforming to fill)
Diameter:	18 in
Length:	100 ft
Inlet Elevation:	25.00 ft
Outlet Elevation:	24.00 ft
Entrance Coefficient:	0.500
Slope:	0.010
Outlet Coefficient:	0.900
Mannings n:	0.013

#### **B.3 HEC-HMS Simulation:**

Simulation Run: QM 2-year Storm
Subbasin: QM Drainage Basin
Meteorologic Model: 2-year / 1 hour Storm
Control Specification: Control -24-hour

Computed Results			
Peak Inflow:	20.8 (cfs)	Time of Peak Inflow:	01:06
Peak Outflow:	7.7 (cfs)	Time of Peak Outflow:	01:16
<b>Total Inflow:</b>	0.6 (ac-ft)	Peak Storage:	0.4 (ac-ft)
<b>Total Outflow:</b>	0.4 (ac-ft)	Peak Elevation:	26.8 (ft)

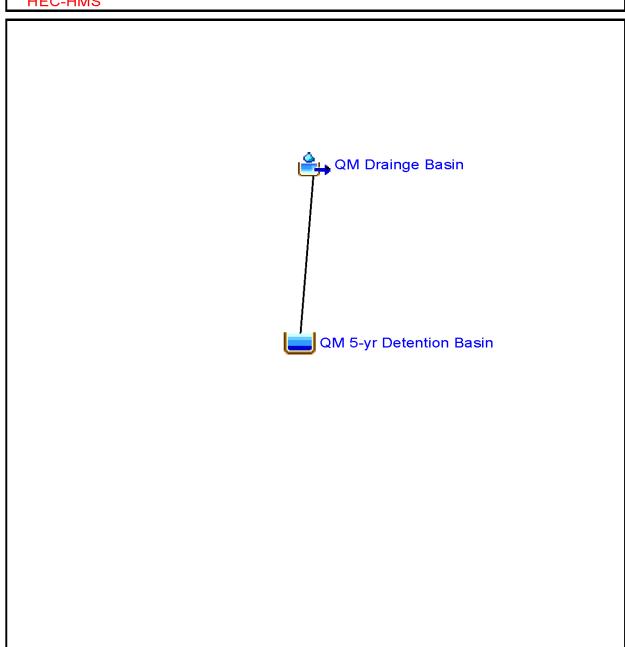


## 2. Quartermaster Site: 5-Year Storm Event



#### **Project: Saipon Lagoon Restoration**

Basin Model: Quarter Master 5-yr Storm Jan 12 07:57:36 HST 2012



## C.Quartermaster Drainage Basin:

#### A.1 Basin Model:

Area: 109 ac (0.1703 mi<sup>2</sup>)

CN: 65

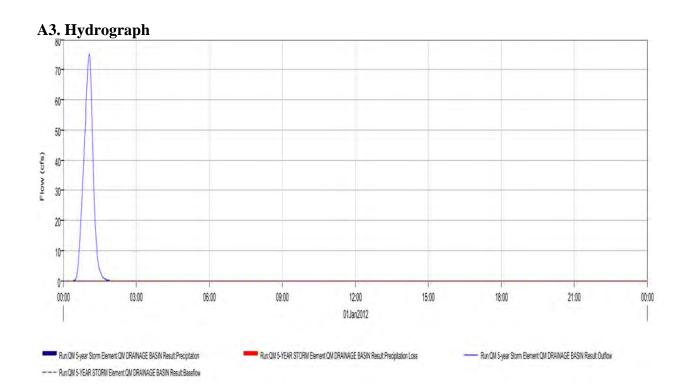
Tc: 10.7 min Rainfall 5-year/1 hour: 2.61 in

Loss Method: SCS Curve Number Transform Method: SCS Unit Hydrograph

#### **A.2 HEC-HMS Simulation Results:**

Simulation Run: QM 5-year Storm
Subbasin: QM Drainage Basin
Meteorologic Model: 5-year / 1 hour Storm
Control Specification: Control -24-hour

Computed Results			
Peak Discharge:	75.0 (cfs)	Time of Peak Discharge:	01:04
<b>Total Precipitation:</b>	22.7 (ac-ft)	<b>Total Direct Runoff:</b>	2.7 (ac-ft)
Total Loss:	20.0 (ac-ft)	<b>Total Baseflow:</b>	0.0 (ac-ft)
<b>Total Excess:</b>	2.7 (ac-ft)	Discharge:	2.7 (ac-ft)



## **D.Quartermaster 5-Year Detention Basin:**

#### **B.1 Detention Basin Design:**

Elevation (ft)	Surf. Area (ac)	Increment Storage (ac-ft)	Cumulative Storage (ac-ft)
23.00	0.180	0.000	0.000
24.00	0.460	0.320	0.320
25.00	0.480	0.470	0.790
26.00	0.510	0.495	1.285
28.00	0.570	1.080	2.365
30.00	0.630	1.200	3.565
32.00	0.690	1.320	4.885

#### **B.2 Outlet Design:**

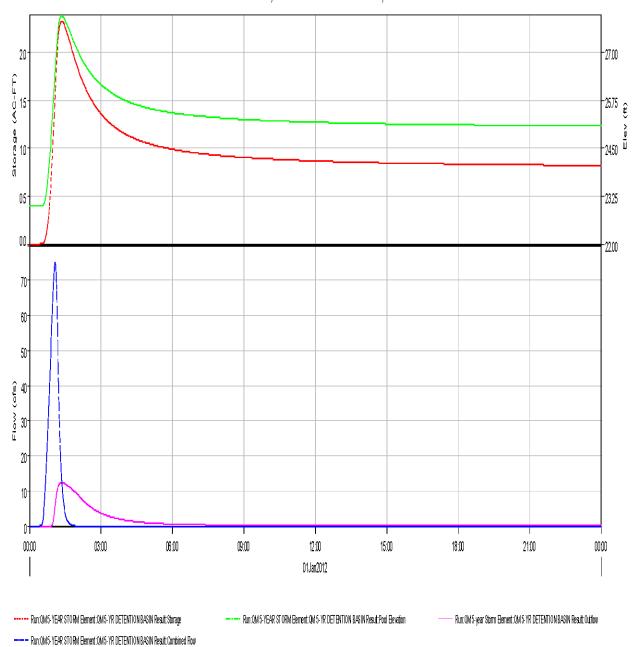
Pipe:	RCP culvert (end-section conforming to fill)
Diameter:	18 in
Length:	100 ft
Inlet Elevation:	25.00 ft
Outlet Elevation:	24.00 ft
Entrance Coefficient:	0.500
Slope:	0.010
Outlet Coefficient:	0.900
Mannings n:	0.013

#### **B.3 HEC-HMS Simulation:**

Simulation Run: QM 5-year Storm
Subbasin: QM Drainage Basin
Meteorologic Model: 5-year / 1 hour Storm
Control Specification: Control -24-hour

Computed Results			
Peak Inflow:	75.0 (cfs)	Time of Peak Inflow:	01:04
Peak Outflow:	<b>12.4</b> (cfs)	Time of Peak Outflow:	01:21
<b>Total Inflow:</b>	2.7 (ac-ft)	Peak Storage:	2.3 (ac-ft)
<b>Total Outflow:</b>	1.9 (ac-ft)	<b>Peak Elevation:</b>	27.9 (ft)

Reservoir "QM 5-yr Detention Basin" Results for Run "QM 5-year Storm"

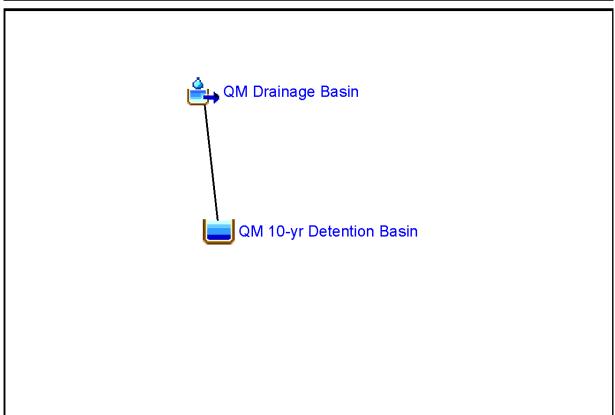


## 3. Quartermaster Site: 10-Year Storm Event



## **Project: Saipon Lagoon Restoration**

Basin Model: Quarter Master 10-yr Storm Dec 27 14:06:46 HST 2011



## A. Quartermaster Drainage Basin:

#### A.1 Basin Model:

Area: 109 ac (0.1703 mi<sup>2</sup>)

CN: 65

Tc: 10.7 min Rainfall 10-year/1 hour: 3.06 in

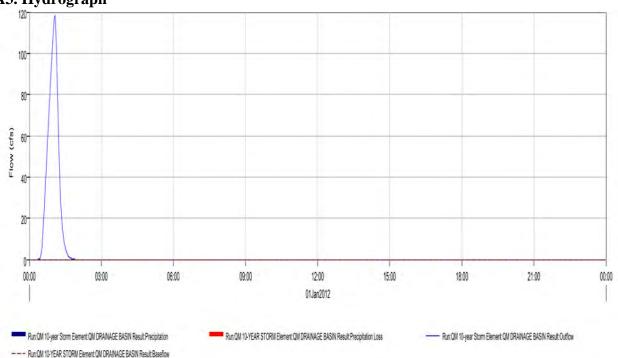
Loss Method: SCS Curve Number
Transform Method: SCS Unit Hydrograph

#### **A.2 HEC-HMS Simulation Results:**

Simulation Run: QM 10-year Storm
Subbasin: QM Drainage Basin
Meteorologic Model: 10-year / 1 hour Storm
Control Specification: Control -24-hour

Computed Results			
Peak Discharge:	118.5 (cfs)	Time of Peak Discharge:	01:04
<b>Total Precipitation:</b>	27.5 (ac-ft)	<b>Total Direct Runoff:</b>	4.7 (ac-ft)
<b>Total Loss:</b>	22.8 (ac-ft)	Total Baseflow:	0.0 (ac-ft)
<b>Total Excess:</b>	4.7 (ac-ft)	Discharge:	4.7 (ac-ft)

#### A3. Hydrograph



## **B. Quartermaster 10-Year Detention Basin:**

#### **B.1 Detention Basin Design:**

Elevation (ft)	Surf. Area (ac)	Increment Storage (ac-ft)	Cumulative Storage (ac-ft)
23.00	0.180	0.000	0.000
24.00	0.680	0.430	0.430
25.00	0.710	0.695	1.125
26.00	0.740	0.725	1.850
28.00	0.810	1.550	3.400
30.00	0.880	1.690	5.090
32.00	0.950	1.830	6.920

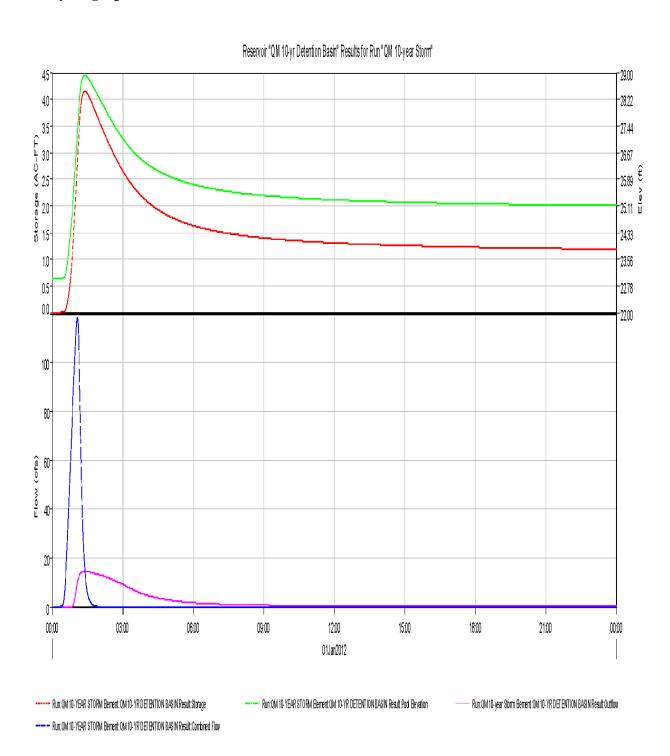
#### **B.2 Outlet Design:**

Pipe:	RCP culvert (end-section conforming to fill)
Diameter:	18 in
Length:	100 ft
Inlet Elevation:	25.00 ft
Outlet Elevation:	24.00 ft
Entrance Coefficient:	0.500
Slope:	0.010
Outlet Coefficient:	0.900
Mannings n:	0.013

#### **B.3 HEC-HMS Simulation:**

Simulation Run: QM 10-year Storm
Subbasin: QM Drainage Basin
Meteorologic Model: 10-year / 1 hour Storm
Control Specification: Control -24-hour

Computed Results			
Peak Inflow:	118.5 (cfs)	Time of Peak Inflow:	01:04
Peak Outflow:	14.5 (cfs)	Time of Peak Outflow:	01:23
<b>Total Inflow:</b>	4.7 (ac-ft)	Peak Storage:	4.2 (ac-ft)
<b>Total Outflow:</b>	3.5 (ac-ft)	Peak Elevation:	28.9 (ft)

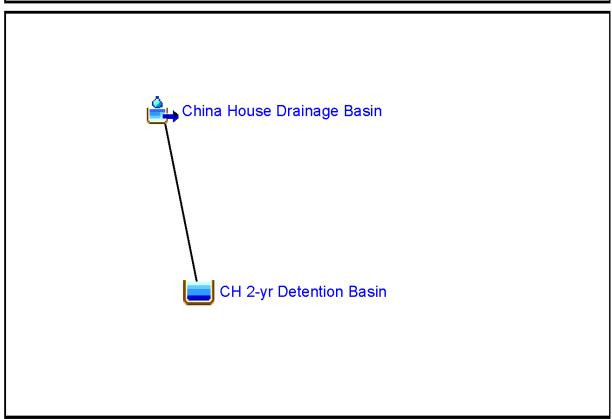


## 4. China House Site: 2-Year Storm Event



#### **Project: Saipon Lagoon Restoration**

Basin Model: China House 2-yr Storm Dec 27 13:50:14 HST 2011



## **A.China House Drainage Basin:**

#### A.1 Basin Model:

Area: 344 ac (0.5375 mi<sup>2</sup>)

CN: 68
Tc: 28.2 min
Rainfall 2-year/1 hour: 1.93 in

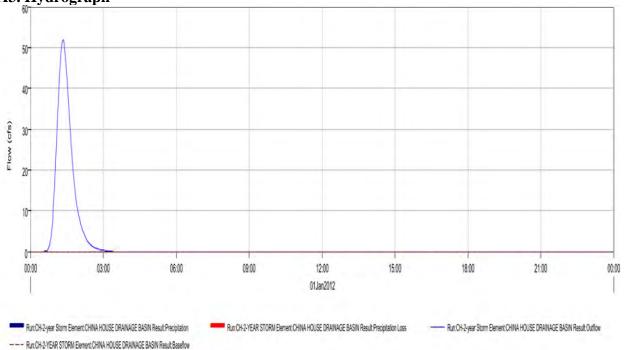
Loss Method: SCS Curve Number Transform Method: SCS Unit Hydrograph

#### **A.2 HEC-HMS Simulation Results:**

Simulation Run: CH 2-year Storm
Subbasin: CH Drainage Basin
Meteorologic Model: 2-year / 1 hour Storm
Control Specification: Control -24-hour

Computed Results			
Peak Discharge:	<b>51.9</b> (cfs)	Time of Peak Discharge:	01:20
<b>Total Precipitation:</b>	48.6 (ac-ft)	<b>Total Direct Runoff:</b>	3.0 (ac-ft)
Total Loss:	45.6 (ac-ft)	Total Baseflow:	0.0 (ac-ft)
<b>Total Excess:</b>	3.0 (ac-ft)	Discharge:	3.0 (ac-ft)





## **B. China House 2-Year Detention Basin:**

#### **B.1 Detention Basin Design:**

Elevation (ft)	Surf. Area (ac)	Increment Storage (ac-ft)	Cumulative Storage (ac-ft)
20.00	0.190	0.000	0.000
21.00	0.450	0.320	0.320
22.00	0.470	0.460	0.780
24.00	0.530	1.000	1.780
26.00	0.580	1.110	2.890
28.00	0.640	1.220	4.110
29.00	0.670	0.655	4.765

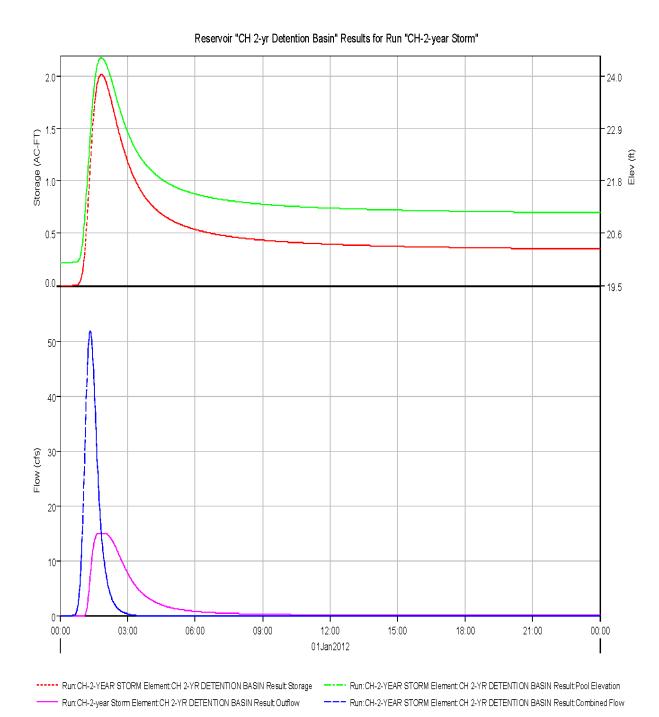
#### **B.2 Outlet Design:**

Pipe:	RCP culvert (end-section conforming to fill)
Diameter:	18 in
Length:	750 ft
Inlet Elevation:	21.00 ft
Outlet Elevation:	7.00 ft
Entrance Coefficient:	0.500
Slope:	0.0187
Outlet Coefficient:	0.900
Mannings n:	0.013

#### **B.3 HEC-HMS Simulation:**

Simulation Run: CH 2-year Storm
Subbasin: CH Drainage Basin
Meteorologic Model: 2-year / 1 hour Storm
Control Specification: Control -24-hour

Computed Results			
Peak Inflow:	<b>51.9</b> (cfs)	Time of Peak Inflow:	01:20
Peak Outflow:	15.0 (cfs)	Time of Peak Outflow:	02:01
<b>Total Inflow:</b>	3.0 (ac-ft)	Peak Storage:	2.0 (ac-ft)
<b>Total Outflow:</b>	2.6 (ac-ft)	<b>Peak Elevation:</b>	24.4 (ft)

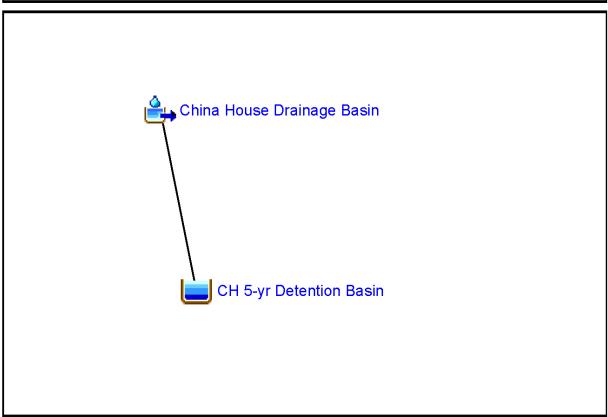


## 5. China House Site: 5-Year Storm Event



## **Project: Saipon Lagoon Restoration**

Basin Model: China House 5-yr Storm Dec 27 14:05:08 HST 2011



## **A.China House Drainage Basin:**

#### A.1 Basin Model:

Area: 344 ac (0.5375 mi<sup>2</sup>)

CN: 68

Tc: 28.2 min Rainfall 5-year/1 hour: 2.61 in

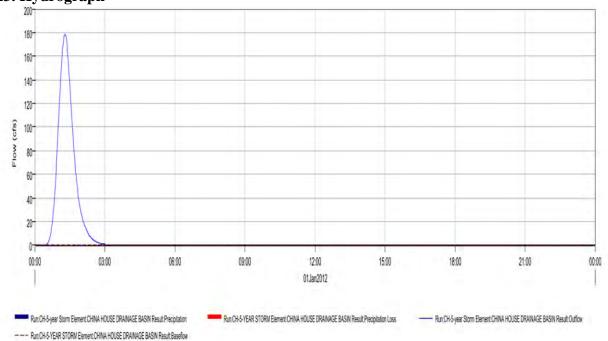
Loss Method: SCS Curve Number Transform Method: SCS Unit Hydrograph

#### **A.2 HEC-HMS Simulation Results:**

Simulation Run: CH 5-year Storm
Subbasin: CH Drainage Basin
Meteorologic Model: 5-year / 1 hour Storm
Control Specification: Control -24-hour

Computed Results			
Peak Discharge:	178.6 (cfs)	Time of Peak Discharge:	01:17
<b>Total Precipitation:</b>	71.6 (ac-ft)	<b>Total Direct Runoff:</b>	11.1 (ac-ft)
<b>Total Loss:</b>	60.5 (ac-ft)	<b>Total Baseflow:</b>	0.0 (ac-ft)
<b>Total Excess:</b>	11.1 (ac-ft)	Discharge:	11.1 (ac-ft)

#### A3. Hydrograph



## **B. China House 5-Year Detention Basin:**

#### **B.1 Detention Basin Design:**

Elevation (ft)	Surf. Area (ac)	Increment Storage (ac-ft)	Cumulative Storage (ac-ft)
19.00	0.190	0.000	0.000
20.00	0.740	0.465	0.465
21.00	1.310	1.025	1.490
22.00	1.360	1.335	2.825
24.00	1.450	2.810	5.635
26.00	1.550	3.000	8.635
28.00	1.650	3.200	11.835
29.00	1.760	1.705	13.540

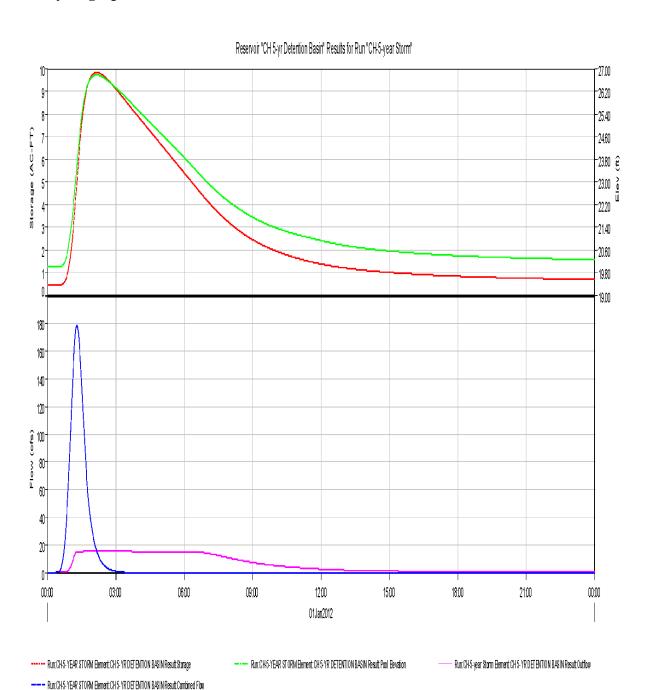
#### **B.2 Outlet Design:**

Pipe:	RCP culvert (end-section conforming to fill)
Diameter:	18 in
Length:	750 ft
Inlet Elevation:	20.00 ft
Outlet Elevation:	7.00 ft
Entrance Coefficient:	0.500
Slope:	0.0173
Outlet Coefficient:	0.900
Mannings n:	0.013

#### **B.3 HEC-HMS Simulation:**

Simulation Run: CH 5-year Storm
Subbasin: CH Drainage Basin
Meteorologic Model: 5-year / 1 hour Storm
Control Specification: Control -24-hour

Computed Results			
Peak Inflow:	178.6 (cfs)	Time of Peak Inflow:	01:17
Peak Outflow:	15.6 (cfs)	Time of Peak Outflow:	02:09
<b>Total Inflow:</b>	11.1 (ac-ft)	Peak Storage:	9.8 (ac-ft)
<b>Total Outflow:</b>	10.9 (ac-ft)	Peak Elevation:	26.8 (ft)

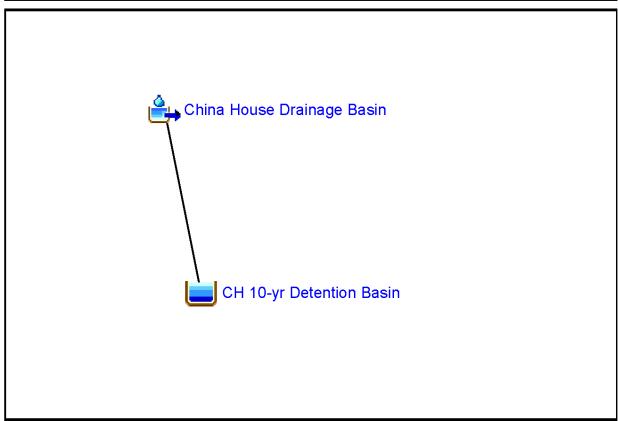


## 6. China House Site: 10-Year Storm Event



## **Project: Saipon Lagoon Restoration**

Basin Model: China House 10-yr Storm Dec 27 11:56:18 HST 2011



## **A.China House Drainage Basin:**

#### A.1 Basin Model:

Area: 344 ac (0.5375 mi<sup>2</sup>)

CN: 68

Tc: 28.2 min Rainfall 10-year/1 hour: 3.06 in

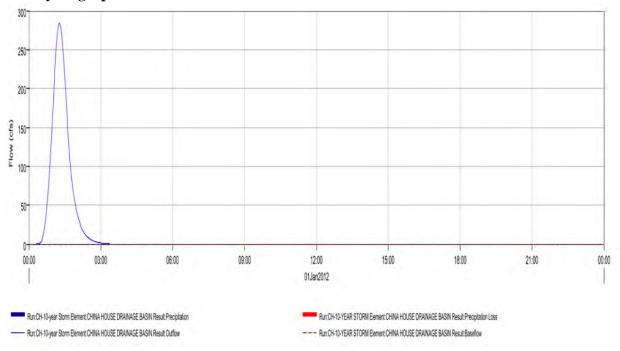
Loss Method: SCS Curve Number Transform Method: SCS Unit Hydrograph

#### **A.2 HEC-HMS Simulation Results:**

Simulation Run: CH 10-year Storm
Subbasin: CH Drainage Basin
Meteorologic Model: 10-year / 1 hour Storm
Control Specification: Control -24-hour

Computed Results			
Peak Discharge:	284.0 (cfs)	Time of Peak Discharge:	01:17
Total Precipitation:	86.6 (ac-ft)	<b>Total Direct Runoff:</b>	18.3 (ac-ft)
<b>Total Loss:</b>	68.3 (ac-ft)	<b>Total Baseflow:</b>	0.0 (ac-ft)
<b>Total Excess:</b>	18.3 (ac-ft)	Discharge:	18.3 (ac-ft)

#### A3. Hydrograph



## **B. China House 10-Year Detention Basin:**

#### **B.1 Detention Basin Design:**

Elevation (ft)	Surf. Area (ac)	Increment Storage (ac-ft)	Cumulative Storage (ac-ft)
18.00	0.001	0.000	0.000
19.00	0.191	0.096	0.096
20.00	0.743	0.467	0.563
21.00	1.312	1.028	1.590
22.00	1.412	1.362	2.953
24.00	1.509	2.921	5.873
26.00	1.609	3.118	8.992
28.00	1.711	3.320	12.312
29.00	1.764	1.737	14.049
30.00	1.817	1.790	15.839

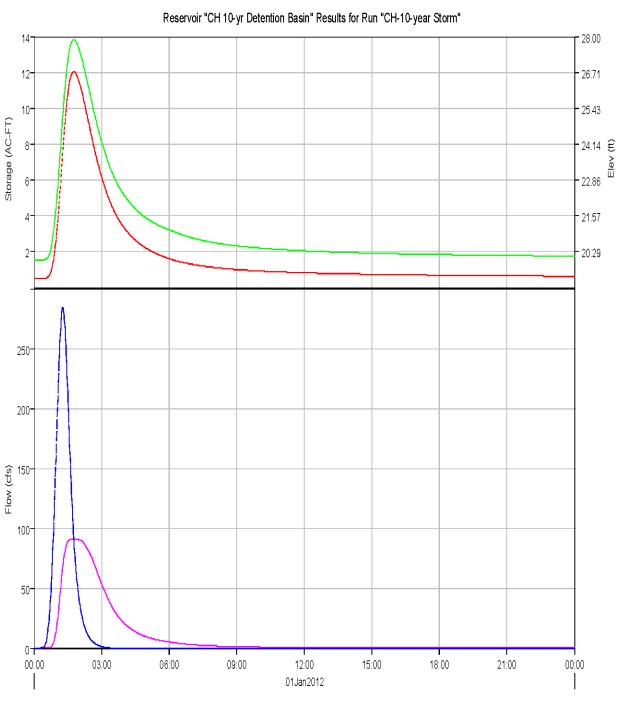
#### **B.2 Outlet Design:**

Pipe:	RCP culvert (end-section conforming to fill)
Diameter:	36 in
Length:	750 ft
Inlet Elevation:	20.00 ft
Outlet Elevation:	7.00 ft
Entrance Coefficient:	0.500
Slope:	0.0173
Outlet Coefficient:	0.900
Mannings n:	0.013

#### **B.3 HEC-HMS Simulation:**

Simulation Run: CH 10-year Storm
Subbasin: CH Drainage Basin
Meteorologic Model: 10-year / 1 hour Storm
Control Specification: Control -24-hour

Computed Results			
Peak Inflow:	284.0 (cfs)	Time of Peak Inflow:	01:17
Peak Outflow:	<b>91.1</b> (cfs)	Time of Peak Outflow:	01:46
<b>Total Inflow:</b>	18.3 (ac-ft)	Peak Storage:	12.0 (ac-ft)
<b>Total Outflow:</b>	18.1 (ac-ft)	<b>Peak Elevation:</b>	27.9 (ft)



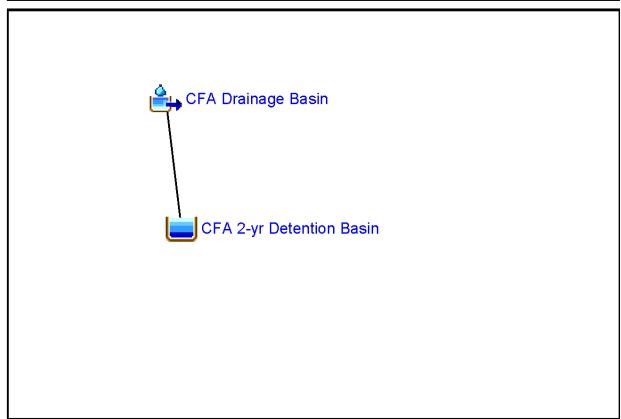
Run:CH-10-YEAR STORM Element CH 10-YR DETENTION BASIN Result Storage ----- Run:CH-10-YEAR STORM Element CH 10-YR DETENTION BASIN Result Pool Elevation
Run:CH-10-YEAR STORM Element CH 10-YR DETENTION BASIN Result Combined Flow

## 7. Cock Fight Arena Site: 2-Year Storm Event



#### **Project: Saipon Lagoon Restoration**

Basin Model: Cock Fight Arena 2-yr Storm Dec 27 14:28:22 HST 2011



## A.Cock Fight Arena Drainage Basin:

#### A.1 Basin Model:

Area: 412.69 ac (0.6448 mi<sup>2</sup>)

CN: 65

Tc: 55.2 min Rainfall 2-year/1 hour: 1.93 in

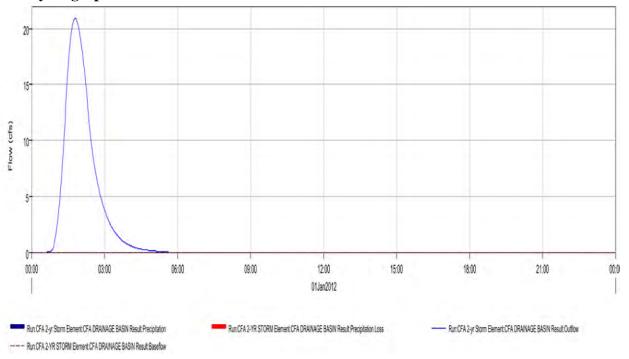
Loss Method: SCS Curve Number Transform Method: SCS Unit Hydrograph

#### **A.2 HEC-HMS Simulation Results:**

Simulation Run: CFA 2-year Storm
Subbasin: CFA Drainage Basin
Meteorologic Model: 2-year / 1 hour Storm
Control Specification: Control -24-hour

Computed Results			
Peak Discharge:	20.9 (cfs)	Time of Peak Discharge:	01:48
<b>Total Precipitation:</b>	58.2 (ac-ft)	<b>Total Direct Runoff:</b>	2.2 (ac-ft)
<b>Total Loss:</b>	<b>56.0</b> (ac-ft)	Total Baseflow:	0.0 (ac-ft)
<b>Total Excess:</b>	2.2 (ac-ft)	Discharge:	2.2 (ac-ft)

#### A3. Hydrograph



## **B.**Cock Fight Arena 2-Year Detention Basin:

#### **B.1 Detention Basin Design:**

Elevation (ft)	Surf. Area (ac)	Increment Storage (ac-ft)	Cumulative Storage (ac-ft)
37.00	0.010	0.000	0.000
40.00	0.970	1.470	1.470
45.00	3.180	10.375	11.845

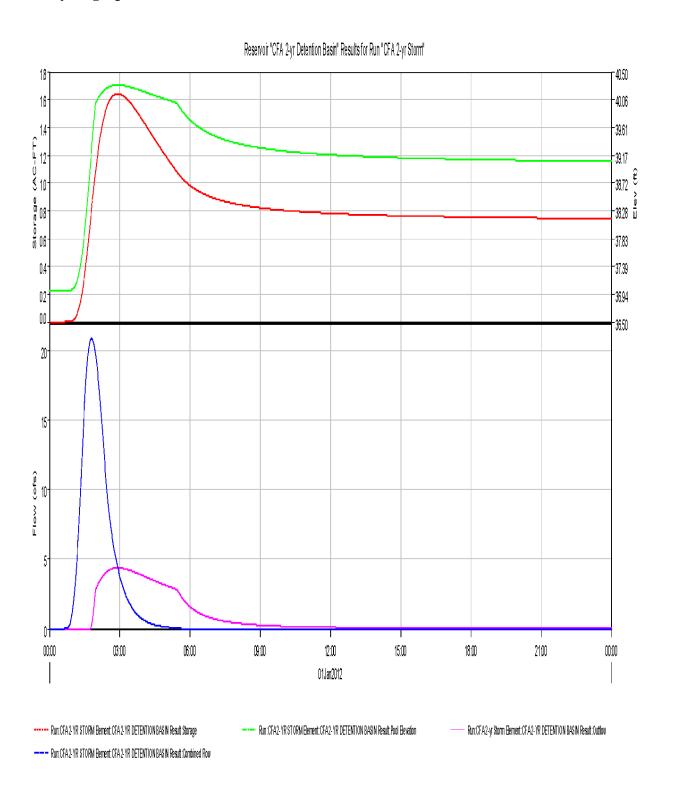
#### **B.2 Outlet Design:**

Pipe:	RCP culvert (end-section conforming to fill)		
Diameter:	18 in		
Length:	2,200 ft		
Inlet Elevation:	39.00 ft		
Outlet Elevation:	7.00 ft		
Entrance Coefficient:	0.500		
Slope:	0.0155		
Outlet Coefficient:	0.900		
Mannings n:	0.013		

#### **B.3 HEC-HMS Simulation:**

Simulation Run: CFA 2-year Storm
Subbasin: CFA Drainage Basin
Meteorologic Model: 2-year / 1 hour Storm
Control Specification: Control -24-hour

Computed Results			
Peak Inflow:	<b>20.9</b> (cfs)	Time of Peak Inflow:	01:48
Peak Outflow:	<b>4.4</b> (cfs)	Time of Peak Outflow:	02:55
<b>Total Inflow:</b>	2.2 (ac-ft)	Peak Storage:	1.6 (ac-ft)
<b>Total Outflow:</b>	1.4 (ac-ft)	Peak Elevation:	40.3 (ft)

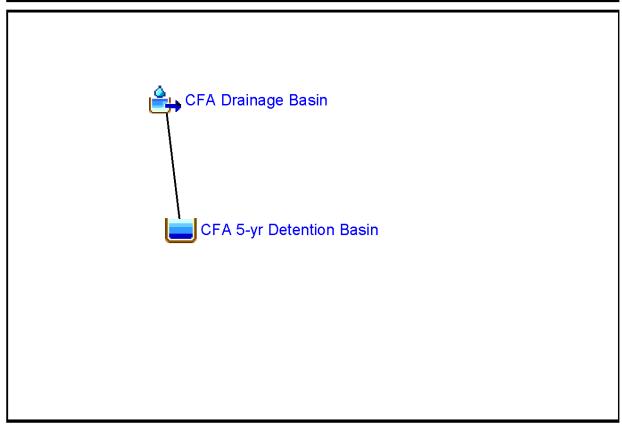


## 8. Cock Fight Arena Site: 5-Year Storm Event



## **Project: Saipon Lagoon Restoration**

Basin Model: Cock Fight Arena 5-yr Storm Dec 27 13:39:27 HST 2011



# A. Cock Fight Arena Drainage Basin:

#### A.1 Basin Model:

Area: 412.69 ac (0.6448 mi<sup>2</sup>)

CN: 65

Tc: 55.2 min Rainfall 5-year/1 hour: 2.61 in

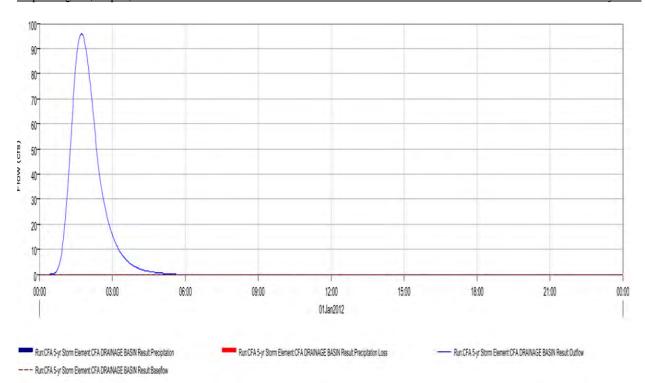
Loss Method: SCS Curve Number Transform Method: SCS Unit Hydrograph

#### **A.2 HEC-HMS Simulation Results:**

Simulation Run: CFA 5-year Storm
Subbasin: CFA Drainage Basin
Meteorologic Model: 5-year / 1 hour Storm
Control Specification: Control -24-hour

Computed Results			
Peak Discharge:	95.9 (cfs)	Time of Peak Discharge:	01:44
<b>Total Precipitation:</b>	85.9 (ac-ft)	<b>Total Direct Runoff:</b>	10.2 (ac-ft)
Total Loss:	75.7 (ac-ft)	Total Baseflow:	0.0 (ac-ft)
<b>Total Excess:</b>	10.2 (ac-ft)	Discharge:	10.2 (ac-ft)

#### A3. Hydrograph



# **B. Cock Fight Arena 5-Year Detention Basin:**

#### **B.1 Detention Basin Design:**

Elevation (ft)	Surf. Area (ac)	Increment Storage (ac-ft)	Cumulative Storage (ac-ft)
37.00	0.010	0.000	0.000
40.00	0.970	1.470	1.470
45.00	3.180	10.375	11.845

#### **B.2 Outlet Design:**

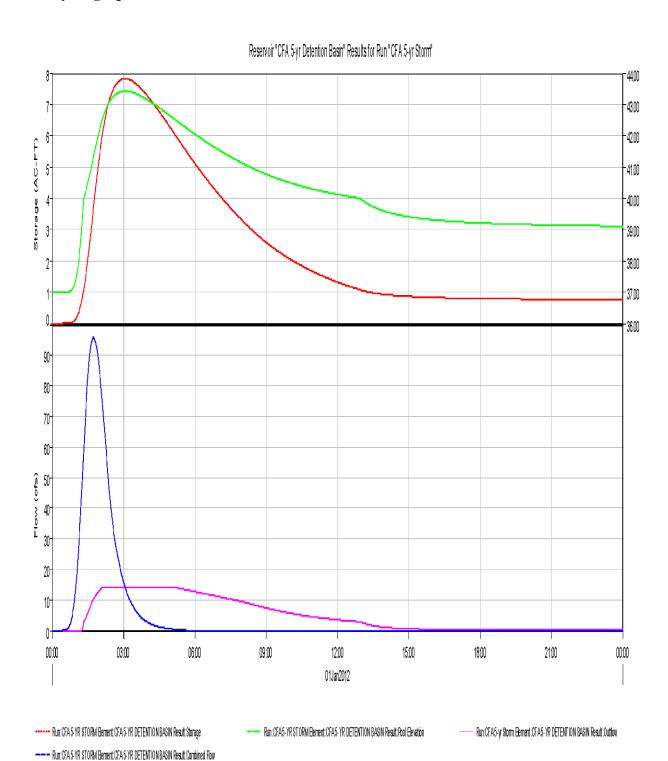
Pipe:	RCP culvert (end-section conforming to fill)
Diameter:	18 in
Length:	2,200 ft
Inlet Elevation:	39.00 ft
Outlet Elevation:	7.00 ft
Entrance Coefficient:	0.500
Slope:	0.0155
Outlet Coefficient:	0.900
Mannings n:	0.013

#### **B.3 HEC-HMS Simulation:**

Simulation Run: CFA 5-year Storm
Subbasin: CFA Drainage Basin
Meteorologic Model: 5-year / 1 hour Storm
Control Specification: Control -24-hour

Computed Results			
Peak Inflow:	95.9 (cfs)	Time of Peak Inflow:	01:44
Peak Outflow:	14.0 (cfs)	Time of Peak Outflow:	05:01
<b>Total Inflow:</b>	10.2 (ac-ft)	Peak Storage:	7.8 (ac-ft)
<b>Total Outflow:</b>	9.4 (ac-ft)	Peak Elevation:	43.4 (ft)

### **B.4 Hydrograph**



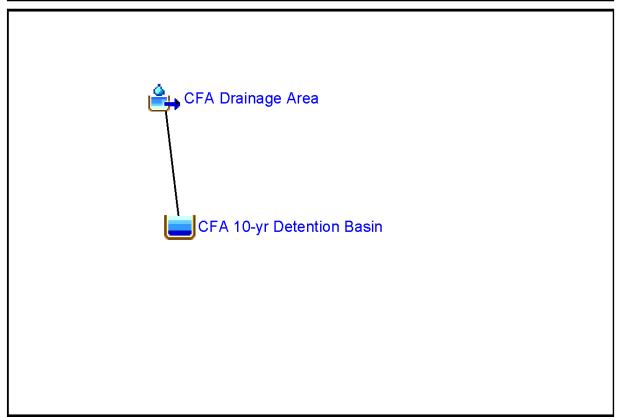
A-33

# 9. Cock Fight Arena Site: 10-Year Storm Event



## **Project: Saipon Lagoon Restoration**

Basin Model: Cock Fight Arena 10-yr Storm Dec 27 12:04:58 HST 2011



# A. Cock Fight Arena Drainage Basin:

#### A.1 Basin Model:

Area: 412.69 ac (0.6448 mi<sup>2</sup>)

CN: 65
Tc: 55.2 min
Rainfall 10-year/1 hour: 3.06 in

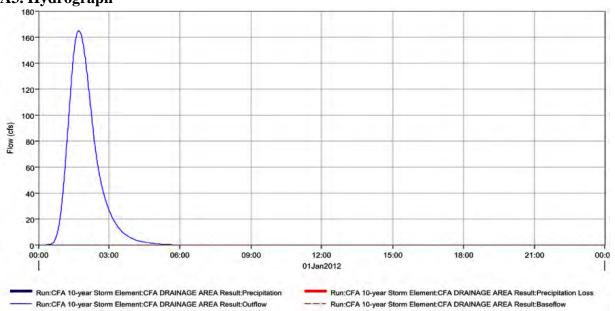
Loss Method: SCS Curve Number Transform Method: SCS Unit Hydrograph

#### **A.2 HEC-HMS Simulation Results:**

Simulation Run: CFA 10-year Storm
Subbasin: CFA Drainage Basin
Meteorologic Model: 10-year / 1 hour Storm
Control Specification: Control -24-hour

Computed Results			
Peak Discharge:	164.7 (cfs)	Time of Peak Discharge:	01:43
<b>Total Precipitation:</b>	103.8 (ac-ft)	<b>Total Direct Runoff:</b>	17.7 (ac-ft)
Total Loss:	86.1 (ac-ft)	Total Baseflow:	0.0 (ac-ft)
<b>Total Excess:</b>	17.7 (ac-ft)	Discharge:	17.7 (ac-ft)

#### A3. Hydrograph



# A.Cock Fight Arena 10-Year Detention Basin:

### **B.1 Detention Basin Design:**

Elevation (ft)	Surf. Area (ac)	Increment Storage (ac-ft)	Cumulative Storage (ac-ft)
37.00	0.010	0.000	0.000
38.00	0.240	0.125	0.125
39.00	0.869	0.555	0.680
40.00	1.722	1.296	1.975
45.00	3.180	12.255	14.230

#### **B.2 Outlet Design:**

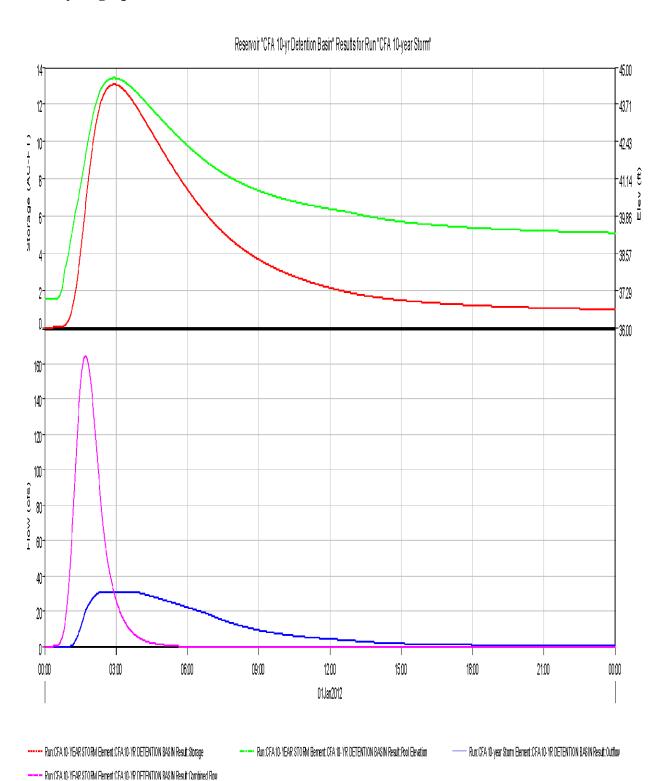
Pipe:	RCP culvert (end-section conforming to fill)
Diameter:	24 in
Length:	2,200 ft
Inlet Elevation:	39.00 ft
Outlet Elevation:	7.00 ft
Entrance Coefficient:	0.500
Slope:	0.0155
Outlet Coefficient:	0.900
Mannings n:	0.013

#### **B.3 HEC-HMS Simulation:**

Simulation Run: CFA 10-year Storm
Subbasin: CFA Drainage Basin
Meteorologic Model: 10-year / 1 hour Storm
Control Specification: Control -24-hour

Computed Results			
Peak Inflow:	164.7 (cfs)	Time of Peak Inflow:	01:43
Peak Outflow:	<b>30.3</b> (cfs)	Time of Peak Outflow:	03.55
<b>Total Inflow:</b>	17.7 (ac-ft)	Peak Storage:	13.1 (ac-ft)
<b>Total Outflow:</b>	16.7 (ac-ft)	<b>Peak Elevation:</b>	44.6 (ft)

### **B.4 Hydrograph**



Appendix B Traffic Data

#### WeeklyVehicle-13 -- English (ENU)

Datasets:

Site: [Site-6] Middle Rd.(30) South of Navy Rd. (37)

Direction: 1 - North bound, A hit first., Lane: 0

Survey Duration: 12:06 Tuesday, July 17, 2007 => 15:09 Wednesday, July 25, 2007

File: C:\Program Files\MetroCount v316\User\Data\Site-625Jul2007.EC0 (Regular)

Identifier: U743JGM5 MC56-L5 [MC55] (c)Microcom 19Oct04

Algorithm: Factory default

Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 12:06 Tuesday, July 17, 2007 => 15:09 Wednesday, July 25, 2007

Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

**Speed range:** 10 - 160 km/h.

Direction: North, East, South, West (bound)

Separation: All - (Headway)
Name: Factory default profile
Scheme: Vehicle classification (ARX)

Units: Metric (meter, kilometer, m/s, km/h, kg, tonne)

In profile: Vehicles = 49798 / 50013 (99.57%)

WeeklyVehicle-13

Site:

Site-6.0N

Description:

Middle Rd.(30) South of Navy Rd. (37)

Filter time:

12:06 Tuesday, July 17, 2007 => 15:09 Wednesday, July 25, 2007 Vehicle classification (ARX)

Scheme:

Filter:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	s 1 - 7
	16 Jul	17 Jul	18 Jul	19 Jul	20 Jul	21 Jul	22 Jul	1 - 5	1 - /
Hour				0.0	96	126	107	62.0	83.8
0000-0100	*	*	0	90		91	50	33.3	48.2
0100-0200	*	*	0	44	56	98	59	23.7	45.6
0200-0300	*	*	0	34	37		60 1	17.7	33.8
0300-0400	*	*	0	25	28	56	45	21.0	30.4
0400-0500	*	*	0	27	36	44 83	77	41.0	56.6
0500-0600	*	*	0	59	64	169	128	127.7	136.0
0600-0700	*	*	0	188	195		268	415.3<	382.2<
0700-0800	*	. *	0	632<	614<	397 385	283	371.0	356.2
0800-0900	*	*	0	559	554	430<	288	340.3	347.8
0900-1000	*	*	0	501	520 544	421	287	348.7	350.8
1000-1100	*	*	0	502	563	421	288<		351.6
1100-1200	*	*	0<	478	589	439	320	276.0	310.5
1200-1300	*	0	0	515	664<	439	357	305.0	334.8
1300-1400	*	0	0	556	603	394	318	339.8	345.2
1400-1500	*	0	219	537	587	401	300	400.8	384.0
1500-1600	*	0	497	519	611	468<	325	438.8<	424.7<
1600-1700	*	0	556<	588<	614	449	374<		415.3
1700-1800	*	0	518	537	431	334	296	312.3	313.2
1800-1900	*	0	389	429	373	322	284	269.5	280.7
1900-2000	*	0	350	355	312	254	296	220.8	238.8
2000-2100	*	0	298	273	289	256	216	192.3	206.8
2100-2200	*	0	231	249	289	223	159	154.8	166.8
2200-2300	*	0	191	198	197	179	126	113.3	126.3
2300-2400	*	0<	127	129	197	1/9	120	113.3	120.0
Totals									
0700-1900	*	*	2179	6353	6894	4979	3704	4312.1	4316.3
0600-2200	*	*	3058	7418	8063	5980	4628	5122.3	5178.6
0600-0000	*	*	3376	7745	8490	6382	4913	5390.3	5471.8
0000-0000	*	*	3376	8024	8807	6880	5311	5588.9	5770.2
0000-0000							1		
AM Peak	*	*	1100	0700	0700	0900	1100		
III I Can	*	*	0	632	614	430	288		
							1700		
PM Peak	*	2300	1600	1600	1300	1600	1700		
	*	0	556	588	664	468	. 374		

<sup>\* -</sup> No data.

WeeklyVehicle-13

Site:

Site-6.0N

Description:

Filter time:

Middle Rd.(30) South of Navy Rd. (37) 12:06 Tuesday, July 17, 2007 => 15:09 Wednesday, July 25, 2007

Scheme:

Vehicle classification (ARX)

Filter:

	Mon	Tue	Wed 25 Jul	Thu 26 Jul	Fri 27 Jul	Sat 28 Jul	Sun 29 Jul	Average	s 1 - 7
	23 Jul	24 Jul	25 Jul	26 541	27 041	20 041	25 041		
Hour	0.1	69	57	*	*	*	*	72.3	72.3
0000-0100	91	50	58	*	*	*	*	49.0	49.0
0100-0200	39 46	51	60	*	*	*	*	52.3	52.3
0200-0300	35	32	35	*	*	*	*	34.0	34.0
0300-0400	36	46	33	*	*	*	*	38.3	38.3
0400-0500	64	69	71	*	*	*	*	68.0	68.0
0500-0600	185	194	167	*	*	*	*	182.0	182.0
0600-0700		640<	649<	*	*	*	*	635.0<	635.0<
0700-0800	616<	507	537	*	*	*	*	526.7	526.7
0800-0900	536		321	*	*	*	*	418.0	418.0
0900-1000	487	446	0	*	*	*	*	302.3	302.3
1000-1100	489	418	0	*	*	*	*	313.3	313.3
1100-1200	451	489	0	*	*	*	*	338.7	338.7
1200-1300	535	481	0	*	*	*	*	366.3	366.3
1300-1400	574	525	0	*	*	*	*	372.0	372.0
1400-1500	569	547<	0	*	*	*	*	338.7	338.7
1500-1600	507	509	*	*	*	*	*	576.5<	576.5<
1600-1700	621<	532	*	*	*	*	*	543.0	543.0
1700-1800	549	537	*	*	*	*	*	376.5	376.5
1800-1900	377	376	*	*	*	*	*	279.0	279.0
1900-2000	306	252	*	*	*	*	*	246.5	246.5
2000-2100	257	236	*	*	*	*	*	233.0	233.0
2100-2200	231	235		*	*	*	*	175.0	175.0
2200-2300	177	173	*	*	*	*	*	110.0	110.0
2300-2400	110	110	*	*				1 110.0	110.0
Totals									
0000 1000	6311	6007	*	*	*	*	*	5107.0	5107.0
0700-1900	7290	6924	*	*	*	*	*	6047.5	6047.5
0600-2200	7577	7207	*	*	*	*	*	6332.5	6332.5
0600-0000	7888	7524	*	*	*	*	*	6646.5	6646.5
0000-0000	7888	7324							
AM Peak	0700	0700	0700	*	*	*	*		
Mi rear	616	640	649	*	*	*	*		
	010	010							
PM Peak	1600	1400	*	*	*	*	*		
III I Can	621	547	*	*	*	*	*		

<sup>\* -</sup> No data.

#### WeeklyVehicle-11 -- English (ENU)

Datasets:

Site: [Site-5] Beach Rd (33) south of Micro Beach

Direction: 1 - North bound, A hit first., Lane: 0

Survey Duration: 12:03 Tuesday, July 17, 2007 => 14:57 Wednesday, July 25, 2007

File: C:\Program Files\MetroCount v316\User\Data\Site-525Jul2007.EC0 (Regular)

Identifier: U747PY52 MC56-L5 [MC55] (c)Microcom 19Oct04

Algorithm: Factory default

Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 12:03 Tuesday, July 17, 2007 => 14:57 Wednesday, July 25, 2007

Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

**Speed range:** 10 - 160 km/h.

Direction: North, East, South, West (bound)

Separation: All - (Headway)
Name: Factory default profile
Scheme: Vehicle classification (ARX)

Units: Metric (meter, kilometer, m/s, km/h, kg, tonne)

In profile: Vehicles = 29674 / 29692 (99.94%)

WeeklyVehicle-11

Site:

Site-5.0N

Description:

Beach Rd (33) south of Micro Beach

Filter time:

12:03 Tuesday, July 17, 2007 => 14:57 Wednesday, July 25, 2007

Scheme:

Vehicle classification (ARX)

Filter:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	
	16 Jul	17 Jul	18 Jul	19 Jul	20 Jul	21 Jul	22 Jul	1 - 5	1 - 7
Hour							67		70.0
0000-0100	*	*	75	57	76	76	67	69.3	70.2
0100-0200	*	*	35	40	49	66	66	41.3	51.2
0200-0300	*	*	36	30	40	115	45	35.3	53.2
0300-0400	*	*	25	16	17	18	22	19.3	19.6
0400-0500	*	*	16	22	21	24	18	19.7	20.2
0500-0600	*	*	44	42	36	52	43	40.7 111.3	99.2
0600-0700	*	*	117	103	114	96	66	268.3	220.6
0700-0800	*	*	264	281<	260	170	128   175	263.3	232.4
0800-0900	*	*	265	260	265	197	174	240.0	219.8
0900-1000	*	*	228	235	257	205 234	222<	264.7	250.0
1000-1100	*	*	269<	249	276 <b>344&lt;</b>	254<	192	282.0<	258.4<
1100-1200	*	*	243	259	344<	242	268	222.5	233.3
1200-1300	*	0	282	281	299	228	269<		239.7
1300-1400	*	0	314	328	312	236	239	233.0	234.5
1400-1500	*	0	294	326	312	229	215	253.5	243.0
1500-1600	*	95	271	336 370	370<		253	338.5	312.5
1600-1700	*	317	297	400<	335	278<	258	360.3<	329.5<
1700-1800	*	360<	346<	361	304	272	262	299.5	288.7
1800-1900	*	261	272 262	349	265	207	221	278.3	256.8
1900-2000	*	237	191	273	222	182	162	223.0	206.0
2000-2100	*	206	180	209	201	198	137	190.0	182.5
2100-2200		170	136	191	192	175	. 126	159.3	156.3
2200-2300	*	118 87	104	84	128	109	68	100.8	96.7
2300-2400	*	87	104	04	120				
Totals									
		*	3345	3686	3661	2813	2655	3260.8	3062.4
0700-1900	*	*	4095	4620	4463	3496	3241	4063.4	3806.9
0600-2200	*	*	4335	4895	4783	3780	3435	4323.4	4059.9
0600-0000	*	*	4555	5102	5022	4131	3696	4549.1	4317.7
0000-0000	*	î e	4300	3102	3022				
AM Peak	*	*	1000	0700	1100	1100	1000		
AM reak	*	*	269	281	344	254	222		
						1.70	1000		
PM Peak	*	1700	1700	1700	1600	1700	1300		
	*	360	346	400	370	278	269		

<sup>\* -</sup> No data.

WeeklyVehicle-11

Site:

Site-5.0N

Description:

Beach Rd (33) south of Micro Beach

Filter time:

12:03 Tuesday, July 17, 2007 => 14:57 Wednesday, July 25, 2007

Scheme:

Vehicle classification (ARX)

Filter:

	Mon	Tue	Wed	Thu	Fri	Sat 28 Jul	Sun 29 Jul	Average	s 1 - 7
	23 Jul	24 Jul	25 Jul	26 Jul	27 Jul	28 Jul	29 Jul	1 - 5	1 - /
Hour			•	*	*	*	*	38.3	38.3
0000-0100	55	60	0	*	*	*	*	1 27.7	27.7
0100-0200	45	38	0	*	*	*	*	21.0	21.0
0200-0300	32	31	0	*	*	*	*	9.0	9.0
0300-0400	13	14	0	*	*	*	*	1 11.0	11.0
0400-0500	19	14	0	*	*	*	*	25.7	25.7
0500-0600	35	42	0	*	*	*	*	65.3	65.3
0600-0700	107	89		*	*	*	*	173.3<	173.3<
0700-0800	252	268<	0	*	*	*	*	154.7	154.7
0800-0900	244	220	0	*	*	*	*	1 125.7	125.7
0900-1000	234	143	0	*	*	*	*	91.7	91.7
1000-1100	275	0	0<	*	*	*	*	93.0	93.0
1100-1200	279<	0	0	*	*	*	*	88.7	88.7
1200-1300	266	0	0	*	*	*	*	102.0	102.0
1300-1400	306		0	*	*	*	*	97.0	97.0
1400-1500	291	0	*	*	*	*	*	154.5	154.5
1500-1600	309	0	*	*	. *	*	*	154.0	154.0
1600-1700	308	0	*	*	*	*	*	177.0<	177.0<
1700-1800	354<		*	*	*	*	*	116.0	116.0
1800-1900	232	0	*	*	*	*	*	110.0	110.0
1900-2000	220		*	*	*	*	*	81.5	81.5
2000-2100	163	0	*	*	*	*	*	73.0	73.0
2100-2200	146	0	*	*	*	*	*	61.5	61.5
2200-2300	123	0	*	*	*	*	*	39.5	39.5
2300-2400	79	0<	î de					33.3	33.3
Totals									
		604	*	*	*	*	*	   1527.5	1527.5
0700-1900	3350	631	*	*	*	*	*	1857.3	1857.3
0600-2200	3986	720			*	*	*	1958.3	1958.3
0600-0000	4188	720	*	*	*	*	*	2091.0	2091.0
0000-0000	4387	919	*	*	*		•	2091.0	2091.0
AM Peak	1100	0700	1100	*	*	*	*		
Art I can	279	268	0	*	. *	*	*		
PM Peak	1700	2300	*	*	*	*	*		
In I can	354	0	*	*	*	*	*		

<sup>\* -</sup> No data.

#### WeeklyVehicle-9 -- English (ENU)

Datasets:

Site: [Site-4] Beach Rd. to Micro Beach West

Direction: 4 - West bound, A hit first., Lane: 0

Survey Duration: 12:01 Tuesday, July 17, 2007 => 13:10 Tuesday, July 24, 2007

File: C:\Program Files\MetroCount v316\User\Data\Site-425Jul2007.EC0 (Regular)

Identifier: U811KBA4 MC56-L5 [MC55] (c)Microcom 19Oct04

Algorithm: Factory default

Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 12:01 Tuesday, July 17, 2007 => 13:10 Tuesday, July 24, 2007

Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

**Speed range:** 10 - 160 km/h.

Direction: North, East, South, West (bound)

Separation: All - (Headway)
Name: Factory default profile
Scheme: Vehicle classification (ARX)

Units: Metric (meter, kilometer, m/s, km/h, kg, tonne)

In profile: Vehicles = 13661 / 13699 (99.72%)

WeeklyVehicle-9

Site:

Site-4.0W

Description:

Beach Rd. to Micro Beach West

Filter time:

\* - No data.

12:01 Tuesday, July 17, 2007 => 13:10 Tuesday, July 24, 2007

Scheme:

Vehicle classification (ARX)

Filter:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	
	16 Jul	17 Jul	18 Jul	19 Jul	20 Jul	21 Jul	22 Jul	1 - 5	1 - 7
Hour								01.7	25 0
0000-0100	*	*	31	25	9	28	32	21.7	25.0
0100-0200	*	*	22	19	16	0	28	19.0	17.0
0200-0300	*	*	27	16	23	0	26	22.0	18.4
0300-0400	*	*	7	6	4	0	12	5.7	5.8
0400-0500	*	*	9	11	8	0	8	9.3	7.2
0500-0600	*	*	37	28	28	30	43	31.0	33.2 59.0
0600-0700	*	*	65	59	68	54	49	64.0	
0700-0800	*	*	105	118	105	. 88	81	109.3	99.4
0800-0900	*	*	118<	135	123	108<	92	125.3	115.2 93.0
0900-1000	*	*	102	95	88	98	82	95.0 106.0	105.8
1000-1100	*	*	117	102	99	102	109		128.2<
1100-1200	*	*	113	156<	151<	103	118<	<b>140.0</b> < 86.0	105.2
1200-1300	*	0	140	126	78	99	188<		103.2
1300-1400	*	0	119	143	111	102	153		115.0
1400-1500	*	0	142	151	138	102	157	107.8	121.5
1500-1600	*	95	127	139	121	128	119	120.5	143.5
1600-1700	*	156	137	174	151	108	135	154.5	197.8<
1700-1800	*	184<	211<	267<	184<	159<	182	211.5<	
1800-1900	*	116	131	212	142	138	129	150.3	144.7
1900-2000	*	96	83	215	117	90	83	127.8	114.0
2000-2100	*	136	82	119	86	74	73	105.8	95.0
2100-2200	*	126	84	59	90	77	54		81.7 52.2
2200-2300	*	85	40	0	78	63	47	50.8	37.0
2300-2400	*	64	39	0	50	37	32	38.3	37.0
Totals								*	
		*	1562	1818	1491	1335	1545	1499.4	1473.9
0700-1900	*	*	1876	2270	1852	1630	1804	1886.7	1823.6
0600-2200	*	*	1955	2270	1980	1730	1883	1975.7	1912.8
0600-0000		*	2088	2375	2068	1788	2032	2084.3	2019.4
0000-0000	*	^	2088	2373	2000	1700	1		
AM Peak	*	*	0800	1100	1100	0800	1100		
AM reak	*	*	118	156	151	108	118		
PM Peak	*	1700	1700	1700	1700	1700	1200		
	*	184	211	267	184	159	188		

WeeklyVehicle-9

Site:

Site-4.0W

Description: Filter time:

Beach Rd. to Micro Beach West

12:01 Tuesday, July 17, 2007 => 13:10 Tuesday, July 24, 2007

Scheme:

Vehicle classification (ARX)

Filter:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	
	23 Jul	24 Jul	25 Jul	26 Jul	27 Jul	28 Jul	29 Jul	1 - 5	1 - 7
Hour								21	
0000-0100	22	22	*	*	*	*	*	22.0	22.0
0100-0200	21	17	*	*	*	*	*	19.0	19.0
0200-0300	17	16	*	*	*	*	*	16.5	16.5
0300-0400	9	1	*	*	*	*	*	5.0	5.0
0400-0500	10	5	*	*	*	*	*	7.5	7.5
0500-0600	27	39	*	*	*	*	*	33.0	33.0
0600-0700	51	62	*	*	*	*	*	56.5	56.5
0700-0800	96	128<	*	*	*	*	*	112.0	112.0
0800-0900	116<	115	*	*	*	*	*	115.5<	115.5<
0900-1000	83	56	*	*	*	*	*	69.5	69.5
1000-1100	110	0	*	*	*	*	*	55.0	55.0
1100-1200	113	0	*	*	*	*	*	56.5	56.5
1200-1300	110	0	*	*	*	*	*	55.0	55.0
1300-1400	86	0	*	*	*	*	*	43.0	43.0
1400-1500	100	*	*	*	*	*	*	100.0	100.0
1500-1600	121	*	*	*	*	*	*	121.0	121.0
1600-1700	156	*	*	*	*	*	*	156.0	156.0
1700-1800	163<	*	*	*	*	*	*	163.0<	163.0<
1800-1900	106	*	*	*	*	*	*	106.0	106.0
1900-2000	91	*	*	*	*	*	*	91.0	91.0
2000-2100	71	*	*	*	*	*	*	71.0	71.0
2100-2200	52	*	*	*	*	*	*	52.0	52.0
2200-2300	33	*	*	*	*	*	*	33.0	33.0
2300-2400	27	*	*	*	*	*	*	27.0	27.0
Totals						1			
0700-1900	1360	*	*	*	*	*	*	1152.5	1152.5
0600-2200	1625	*	*	*	*	*	*	1423.0	1423.0
0600-0000	1685	*	*	*	*	*	*	1483.0	1483.0
0000-0000	1791	*	*	*	*	*	*	1586.0	1586.0
AM Peak	0800	0700	*	*	*	*	*		
	116	128	*	*	*	*	*		
PM Peak	1700	*	*	*	*	*	*		
221 2001	163	*	*	*	*	*	*		

<sup>-</sup> No data.

#### WeeklyVehicle-7 -- English (ENU)

Datasets:

Site: [Site-3] MC5xxx Factory Setup

2 - East bound, A hit first., Lane: 0 Direction:

**Survey Duration:** 10:40 Tuesday, July 17, 2007 => 14:41 Wednesday, July 25, 2007

C:\Program Files\MetroCount v316\User\Data\Site-325Jul2007.EC0 (Regular) File:

U869NC7M MC56-L5 [MC55] (c)Microcom 19Oct04 Identifier:

Factory default Algorithm: Axle sensors - Paired (Class/Speed/Count)

Data type:

Profile:

10:40 Tuesday, July 17, 2007 => 14:41 Wednesday, July 25, 2007 Filter time:

Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

10 - 160 km/h. Speed range:

North, East, South, West (bound) Direction:

All - (Headway) Separation: Factory default profile Name: Vehicle classification (ARX) Scheme:

Metric (meter, kilometer, m/s, km/h, kg, tonne) Units:

Vehicles = 27754 / 27771 (99.94%) In profile:

WeeklyVehicle-7

Site:

Site-3.0E

Description:

MC5xxx Factory Setup

Filter time:

10:40 Tuesday, July 17, 2007 => 14:41 Wednesday, July 25, 2007

Scheme:

Vehicle classification (ARX)

Filter:

	Mon 16 Jul	Tue 17 Jul	Wed 18 Jul	Thu 19 Jul	Fri 20 Jul	Sat 21 Jul	Sun 22 Jul	Average	s 1 - 7
Haum	16 Jul	17 Jul	18 541	19 001	20 041	21 041	22 041	1 3	
Hour 0000-0100	*	*	64	63	74	82	59	67.0	68.4
0100-0200	*	*	45	54	44	63	68	47.7	54.8
0200-0300	*	*	35	38	47	98	49	40.0	53.4
0300-0400	*	*	26	23	18	27	30	22.3	24.8
0400-0500	*	*	12	17	17	30	19	15.3	19.0
0500-0600	*	*	29	35	30	40	29	31.3	32.6
0600-0700	*	*	105	90	94	85	55 I	96.3	85.8
0700-0800	*	*	252	248	246	155	109	248.7	202.0
0800-0900	*	*	262<	245	265	187	162	257.3	224.2
0900-1000	*	*	258	280<	296<		184		246.4<
1000-1100	*	0	256	237	263	211	195<	189.0	193.7
1100-1200	*	0	239	211	285	224<	157	183.8	186.0
1200-1300	*	0	272	265	341<	210	206	219.5	215.7
1300-1400	*	0	319	312	323	239	253<	238.5	241.0
1400-1500	*	49	312	294	304	217	211	239.8	231.2
1500-1600	*	282	261	286	287	210	195	279.0	253.5
1600-1700	*	305	321<	334<	318	245	241	319.5<	294.0<
1700-1800	*	320<	299	288	322	263<	223	307.3	285.8
1800-1900	*	238	214	269	237	227	237	239.5	237.0
1900-2000	*	181	222	258	227	195	191	222.0	212.3
2000-2100	*	203	173	198	188	151	153	190.5	177.7
2100-2200	*	145	145	194	183	161	117	166.8	157.5
2200-2300	*	133	138	164	178	170	132	153.3	152.5
2300-2400	*	100	112	87	119	86	71	104.5	95.8
Totals									
0700-1900	*	*	3265	3269	3487	2602	2373	2999.8	2810.4
0600-2200	*	*	3910	4009	4179	3194	2889	3675.3	3443.7
0600-0000	*	*	4160	4260	4476	3450	3092	3933.1	3692.1
0000-0000	*	*	4371	4490	4706	3790	3346	4156.8	3945.1
AM Peak	*	*	0800	0900	0900	1100	1000		
An reak	*	*	262	280	296	224	195		
PM Peak	*	1700	1600	1600	1200	1700	1300		
	*	320	321	334	341	263	253		

<sup>\* -</sup> No data.

WeeklyVehicle-7

Site:

Site-3.0E

Description:

Filter time:

MC5xxx Factory Setup 10:40 Tuesday, July 17, 2007 => 14:41 Wednesday, July 25, 2007

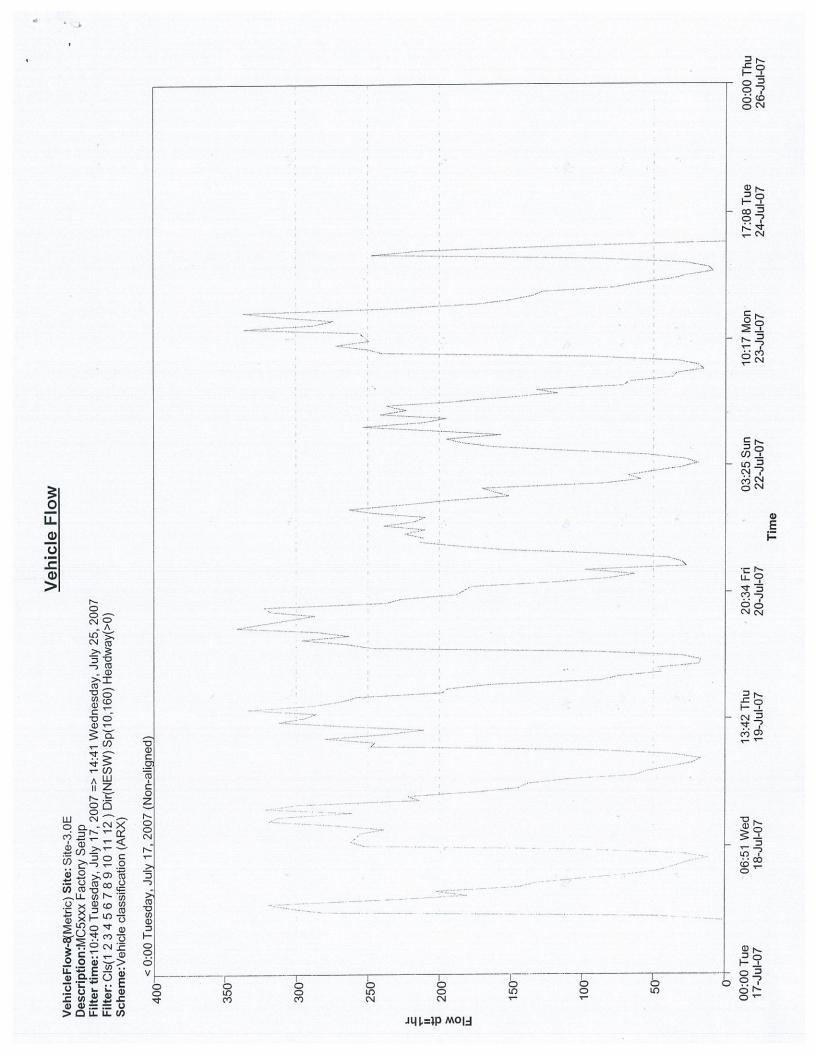
Scheme:

Vehicle classification (ARX)

Filter:

	Mon	Tue 24 Jul	Wed 25 Jul	Thu 26 Jul	Fri 27 Jul	Sat 28 Jul	Sun 29 Jul	Average	1 - 7
•	23 Jul	24 Jul	25 Jul	26 Jul	27 541	28 541	29 001	1 - 3	1 - /
Hour 0000-0100	67	61	0	*	*	*	*	42.7	42.7
0100-0100	36	38	0	*	*	*	*	24.7	24.7
0200-0300	34	27	0	*	*	*	*	20.3	20.3
0300-0300	15	9	0	*	*	*	*	8.0	8.0
	19	12	0	*	*	*	*	10.3	10.3
0400-0500	32	28	0	*	*	*	*	20.0	20.0
0500-0600	94	89	0	*	*	*	*	61.0	61.0
0600-0700		247<	0	*	*	*	*	162.3<	162.3<
0700-0800	240		0	*	*	*	*	154.7	154.7
0800-0900	250	214	0	*	*	*	*	128.3	128.3
0900-1000	272<	113	0	*	*	*	*	83.0	83.0
1000-1100	249	0		*	*	*	*	84.0	84.0
1100-1200	252	0	0<	*	*	*	*	85.3	85.3
1200-1300	256	0	0		*	*	*	112.0	112.0
1300-1400	336	0	0	*	*	*	*		
1400-1500	288	0	0	*				96.0	96.0
1500-1600	274	0	*	*	*	*	*	137.0	137.0
1600-1700	311	0	*	*	*	*	*	155.5	155.5
1700-1800	337<	0	*	*	*	*	*	168.5<	168.5<
1800-1900	230	0	*	*	*	*	*	115.0	115.0
1900-2000	174	0	*	*	*	*	*	87.0	87.0
2000-2100	150	0	*	*	*	*	*	75.0	75.0
2100-2200	135	0	*	*	*	*	*	67.5	67.5
2200-2300	128	0	*	*	*	*	*	64.0	64.0
2300-2400	78	0<	*	*	*	*	*	39.0	39.0
Totals									
TOTALS _									
0700-1900	3295	574	*	*	*	*	*	1481.7	1481.7
0600-2200	3848	663	*	*	*	*	*	1772.2	1772.2
0600-0000	4054	663	*	*	*	*	*	1875.2	1875.2
0000-0000	4257	838	*	*	*	*	*	2001.2	2001.2
	2225	0700	1100	*	*	*	* 1		
AM Peak	0900	0700	1100	*	*	*	^ ! * !		
	272	247	0	*	*	•			
PM Peak	1700	2300	*	*	*	*	*		
222 2001	337	0	*	*	*	*	*		

<sup>\* -</sup> No data.



#### WeeklyVehicle-6 -- English (ENU)

Datasets:

[Site-2] MCSetup factory setup (NAVY HILL Rd (37) east of middle Rd (30) Site:

Direction:

4 - West bound, A hit first., Lane: 0

**Survey Duration:** 

10:35 Tuesday, July 17, 2007 => 14:32 Wednesday, July 25, 2007

File:

C:\Program Files\MetroCount v316\User\Data\Site-225Jul2007.EC0 (Regular)

Identifier:

U7883DG0 MC56-L5 [MC55] (c)Microcom 19Oct04

Algorithm:

Factory default

Data type:

Axle sensors - Paired (Class/Speed/Count)

Profile:

10:35 Tuesday, July 17, 2007 => 14:32 Wednesday, July 25, 2007 Filter time:

Included classes:

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Speed range:

10 - 160 km/h.

Direction:

North, East, South, West (bound)

Separation:

All - (Headway)

Name:

Factory default profile

Scheme:

Vehicle classification (ARX)

Units:

Metric (meter, kilometer, m/s, km/h, kg, tonne)

In profile:

Vehicles = 2194 / 6229 (35.22%)

WeeklyVehicle-6

Site:

MCSetup factory setup Namy HM ind (31) cust of Middle Rd (30)
10:35 Tuesday, July 17, 2007 => 14:32 Wednesday, July 25, 2007
Vehicle classification (ARX)

Description: Filter time:

Scheme:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages	3
	16 Jul		18 Jul	19 Jul	20 Jul	21 Jul	22 Jul	1 - 5	1 - 7
Hour									
0000-0100	*	*	0	6	2	13	13	2.7	6.8
0100-0200	*	*	0	4	4	5	4	2.7	3.4
0200-0300	*	*	0	4	2	1	2	2.0	1.8
0300-0400	*	*	0	0	0	0	0	0.0	0.0
0400-0500	*	*	0	5	1	0	1	2.0	1.4
0500-0600	*	*	0	5	1	4	5	2.0	3.0
0600-0700	*	*	0	6	11	8	2	5.7	5.4
0700-0800	*	*	0	34<	28<	11	13	20.7<	17.2<
0800-0900	*	*	0	23	14	15	17	12.3	13.8
0900-1000	*	*	0	11	12	30<	20	7.7	14.6
1000-1100	*	0	0	13	14 🥦	17	21<	6.8	10.8
1100-1200	*	0	0<	15	7	16	10	5.5	8.0
1200-1300	*	0	0	23	16	31	20	9.8	15.0 10.7
1300-1400	*	0	0	13	14	24	13	6.8	8.8
1400-1500	*	0	0	14	13	17	9	6.8 9.3	12.0
1500-1600	*	0	12	12	13	14	21	11.5	17.5
1600-1700	*	0	18	18	10	37<	22   <b>27&lt;</b>	25.8<	26.5<
1700-1800	*	0	38<	25	40	29		23.8	23.7
1800-1900	*	. 0	27	33<	35	25	22   16	18.3	19.2
1900-2000	*	0	11	21	41<	26	12	9.0	10.8
2000-2100	*	0	20	9	7	17	14	12.0	14.5
2100-2200	*	0	5	13	30	25	5 1	8.5	10.0
2200-2300	*	0	13	7	14	21	4 1	6.8	7.2
2300-2400	*	0<	6	4	17	12	4	0.0	, 1.2
Totals									
0700-1900	*	*	95	234	216	266	215	146.4	178.6
0600-2200	*	*	131	283	305	342	259	191.3	228.5
0600-0000	*	*	150	294	336	375	268	206.6	245.7
0000-0000	*	*	150	318	346	398	293	217.9	262.1
0000 0000							1		
AM Peak	*	*	1100	0700	0700	0900	1000		
	*	*	0	34	28	30	21		
PM Peak	*	2300	1700	1800	1900	1600	1700		
rm reak	*	0	38	33	41	37	27		
								, * ·	

<sup>\* -</sup> No data.

WeeklyVehicle-6

Site:

Site-2.0W

Description:

MCSetup factory setup

Filter time:

10:35 Tuesday, July 17, 2007 => 14:32 Wednesday, July 25, 2007

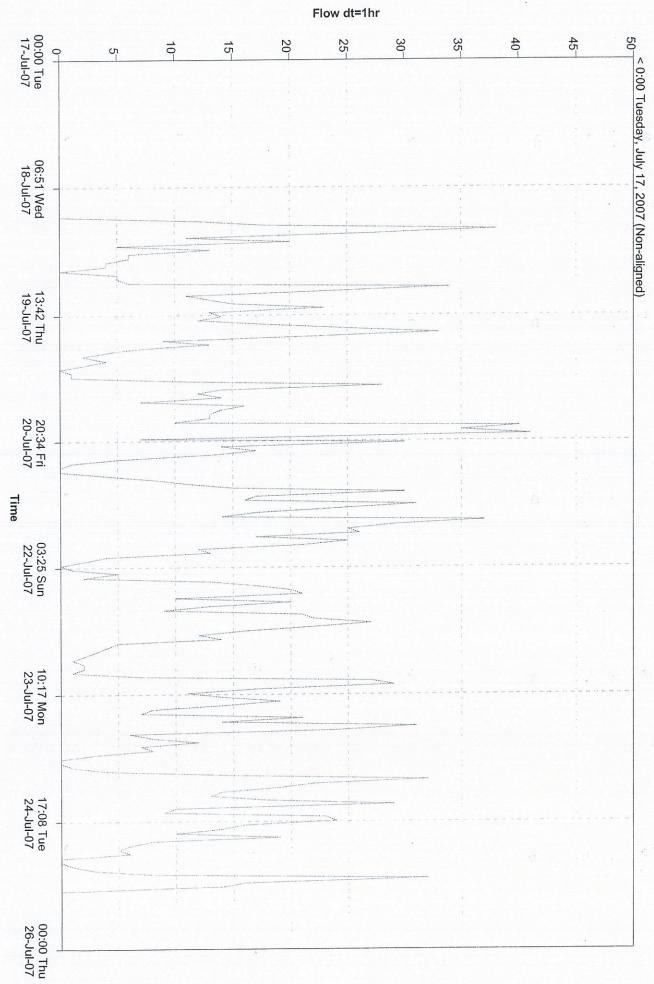
Scheme:

Vehicle classification (ARX)

Filter:

	Mon	Tue	Wed	Thu	Fri	Sat 28 Jul	Sun 29 Jul	Average: 1 - 5	s 1 - 7
	23 Jul	24 Jul	25 Jul	26 Jul	27 Jul	28 Jui	29 Jul	1 - 3	/
Hour				*	*	*	* 1	5.3	5.3
0000-0100	3	8	5	*	*	*	* 1	3.7	3.7
0100-0200	2	. 3	6	*	*	*	* 1	0.3	0.3
0200-0300	1	0	0	*	*	*	* 1	0.7	0.7
0300-0400	2	0	0	*	*	*	* 1	1.3	1.3
0400-0500	2	1	1	*	*	*	*	2.7	2.7
0500-0600	1	4	3	*	*	*	* 1	10.0	10.0
0600-0700	7	15	8	*	*	*	* 1	30.3<	30.3<
0700-0800	27	32<	32<	*	*	*	* 1	22.3	22.3
0800-0900	29<	22	16	*	*	*	* 1	16.7	16.7
0900-1000	17	19	14	*	*	*	* 1	8.3	8.3
1000-1100	11	14	0	*	*	*	* 1	9.0	9.0
1100-1200	14	13	. 0	*	*	*	* 1	12.3	12.3
1200-1300	19	18	0	*	*	*	* 1	14.3	14.3
1300-1400	14	29<	0	*	*	*	*	6.0	6.0
1400-1500	8	10	0	*	*	*	* 1	8.0	8.0
1500-1600	7	9	*	*	*	*	* 1	22.0	22.0
1600-1700	21	23		*	*	*	*	19.0	19.0
1700-1800	14	24	*	*	*	*	* 1	23.5<	23.5<
1800-1900	31<	16	,*	*	*	*	*	19.0	19.0
1900-2000	24	14	*	*	*	*	* 1	8.0	8.0
2000-2100	6	10	*	*	*	*	* 1	13.5	13.5
2100-2200	8	19		*	*	*	* 1	10.0	10.0
2200-2300	12	8	*	*	*	*	* 1	6.5	6.5
2300-2400	7	6	*					0.5	0.0
Totals									
0700-1900	212	229	*	*	*	*	*	191.8	191.8
0600-2200	257	287	*	*	*	*	*	242.3	242.3
0600-2200	276	301	*	*	*	*	* .	258.8	258.8
0000-0000	287	317	*	*	*	*	*	272.8	272.8
AM Peak	0800	0700	0700	*	*	*	*		
Avi reak	29	32	32	*	*	*	*		
PM Peak	1800	1300	*	*	*	*	*		
IN reak	31	29	*	*	*	*	*		

<sup>\* -</sup> No data.



#### WeeklyVehicle-2 -- English (ENU)

Datasets:

Site: [Site-1] Middle Rd. (30) North of Navy Hill Rd.(37)

Direction: 3 - South bound, A hit first., Lane: 0

Survey Duration: 11:57 Tuesday, July 17, 2007 => 13:42 Wednesday, July 25, 2007

File: C:\Program Files\MetroCount v316\User\Data\Site-125Jul2007.EC0 (Regular)

Identifier: U734RFPD MC56-L5 [MC55] (c)Microcom 19Oct04

Algorithm: Factory default

Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 11:57 Tuesday, July 17, 2007 => 13:42 Wednesday, July 25, 2007

Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

**Speed range:** 10 - 160 km/h.

Direction: North, East, South, West (bound)

Separation: All - (Headway)
Name: Factory default profile
Scheme: Vehicle classification (ARX)

Units: Metric (meter, kilometer, m/s, km/h, kg, tonne)

In profile: Vehicles = 63795 / 64120 (99.49%)

WeeklyVehicle-2

Site:

Site-1.0S

Description:

Filter time:

Middle Rd. (30) North of Navy Hill Rd.(37) 11:57 Tuesday, July 17, 2007 => 13:42 Wednesday, July 25, 2007

Scheme:

Vehicle classification (ARX)

Filter:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	
	16 Jul	17 Jul	18 Jul	19 Jul	20 Jul	21 Jul	22 Jul	1 - 5	1 - 7
Hour						450	100	111 0	121.6
0000-0100	*	*	117	107	109	152	123	111.0	54.2
0100-0200	*	*	35	42	53	78	63	43.3	46.6
0200-0300	*	*	33	36	47	75	42	38.7	31.2
0300-0400	*	*	25	22	29	42	38	25.3	
0400-0500	*	*	22	29	28	31	34	26.3	28.8
0500-0600	*	*	94	96	90	94	91	93.3	93.0
0600-0700	*	*	202	180	187	196	129	189.7	178.8
0700-0800	*	*	673	716	698	380	248	695.7<	543.0 566.2
0800-0900	*	*	647	666	648	504	366	653.7 676.0	601.4<
0900-1000	*	*	703	611	714	561	418	657.3	571.4
1000-1100	*	*	604	632	736	547	338	590.8	559.7
1100-1200	*	0	704<	768<	891<	561<	434<	547.8	534.7
1200-1300	*	0	691	699	801	543	474	547.8	507.5
1300-1400	*	0	666	681	750	545	403	732.5	648.8
1400-1500	*	649	707	766	808	564	399	651.5	585.5
1500-1600	*	626	603	621	756	482	425		809.7<
1600-1700	*	944<	952<	915<	964<	547	536<	943.8<	759.5
1700-1800	*	859	837	808	929	640<	484	858.3	519.0
1800-1900	*	507	545	551	559	518	434	540.5	
1900-2000	*	436	420	461	530	438	403	461.8 299.5	448.0
2000-2100	*	280	312	280	326	285	286		240.5
2100-2200	*	202	203	221	283	329	205	227.3	207.2
2200-2300	*	182	186	214	238	240	183	205.0	146.2
2300-2400	*	141	142	144	149	187	114	144.0	140.2
Totals							4		
0700-1900	*	*	8332	8434	9254	6392	4959	8071.9	7206.3
	*	*	9469	9576	10580	7640	5982	9250.1	8368.5
0600-2200	*	*	9797	9934	10967	8067	6279	9599.1	8721.8
0600-0000	*	*	10123	10266	11323	8539	6670 I	9937.1	9097.2
0000-0000			10125	10200	22020		i		
AM Peak	*	*	1100	1100	1100	1100	1100		
Ar rear	*	*	704	768	891	561	434		
						1700	1600		
PM Peak	*	1600	1600	1600	1600	1700	1600		
	*	944	952	915	964	640	536		

<sup>\* -</sup> No data.

WeeklyVehicle-2

Site:

Site-1.0S

Description:

Middle Rd. (30) North of Navy Hill Rd.(37) 11:57 Tuesday, July 17, 2007 => 13:42 Wednesday, July 25, 2007

Filter time:

Scheme:

Vehicle classification (ARX)

Filter:

	Mon 23 Jul	Tue 24 Jul	Wed 25 Jul	Thu 26 Jul	Fri 27 Jul	Sat 28 Jul	Sun 29 Jul	Average 1 - 5	s 1 - 7
	23 Jul	24 Jul	25 Jul	26 Jul	27 Jul	20 041	29 041		- '
Hour 0000-0100	87	96	0	*	*	*	*	61.0	61.0
	44	45	0	*	*	*	*	29.7	29.7
0100-0200	34	65	0	*	*	*	*	33.0	33.0
0200-0300	27	22	0	*	*	*	*	16.3	16.3
0300-0400	34	27	0	*	*	*	*	20.3	20.3
0400-0500	88	112	0	*	*	*	*	66.7	66.7
0500-0600		172	,0	*	*	*	*	118.0	118.0
0600-0700	182	660	0	*	*	*	*	451.0<	451.0<
0700-0800	693	662<	0	*	*	*	*	444.7	444.7
0800-0900	672	123	0	*	*	*	*	275.3	275.3
0900-1000	703	0	0	*	*	*	*	233.0	233.0
1000-1100	699		0<	*	*	*	*	243.7	243.7
1100-1200	731<	0	0	*	*	*	*	244.3	244.3
1200-1300	733		0	*	*	*	*	216.3	216.3
1300-1400	649	0	*	*	*	*	*	375.0	375.0
1400-1500	750		*	*	*	*	*	312.0	312.0
1500-1600	624	0	*	*	*	*	*	464.5<	464.5<
1600-1700	929<	0	*	*	*	*	*	416.5	416.5
1700-1800	833	0	*	*	*	*	*	217.0	217.0
1800-1900	434	0	*	*	*	*	*	185.0	185.0
1900-2000	370	0		*	*	*	*	124.0	124.0
2000-2100	248	0	*	*	*	*	*	94.0	94.0
2100-2200	188	0	*		*	*	*		
2200-2300	193	0	*	. *		*	*	96.5	96.5 59.5
2300-2400	119	0<	*	*	*	*	*	59.5	59.5
Totals									
0700-1900	8450	1445	*	*	*	*	*	3893.3	3893.3
0600-2200	9438	1617	*	*	*	*	*	4414.3	4414.3
0600-0000	9750	1617	*	*	*	*	*	4570.3	4570.3
0000-0000	10064	1984	*	*	*	***	* 4	4797.3	4797.3
AM Peak	1100	0800	1100	*	*	*	*		
	731	662	0	*	*	*	*	***	
PM Peak	1600	2300	*	*	*	*	*		
and the state of t	929	0	*	*	*	*	*		

<sup>-</sup> No data.

#### WeeklyVehicle-25 -- English (ENU)

Datasets:

[Site-12] QuarterMaster(35) Between Beach Rd.(33) and Middle Rd(30) Site:

4 - West bound, A hit first., Lane: 0 Direction:

11:37 Tuesday, July 17, 2007 => 16:10 Wednesday, July 25, 2007 **Survey Duration:** 

C:\Program Files\MetroCount v316\User\Data\Site-1225Jul2007.EC0 (Regular) File:

U7855HFX MC56-L5 [MC55] (c)Microcom 19Oct04 Identifier:

Factory default Algorithm:

Axle sensors - Paired (Class/Speed/Count) Data type:

Profile:

11:37 Tuesday, July 17, 2007 => 16:10 Wednesday, July 25, 2007 Filter time:

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 Included classes:

10 - 160 km/h. Speed range:

North, East, South, West (bound) Direction:

All - (Headway) Separation: Factory default profile Name: Vehicle classification (ARX) Scheme:

Metric (meter, kilometer, m/s, km/h, kg, tonne) Units:

Vehicles = 7278 / 7328 (99.32%) In profile:

WeeklyVehicle-25

Site:

Site-12.0W

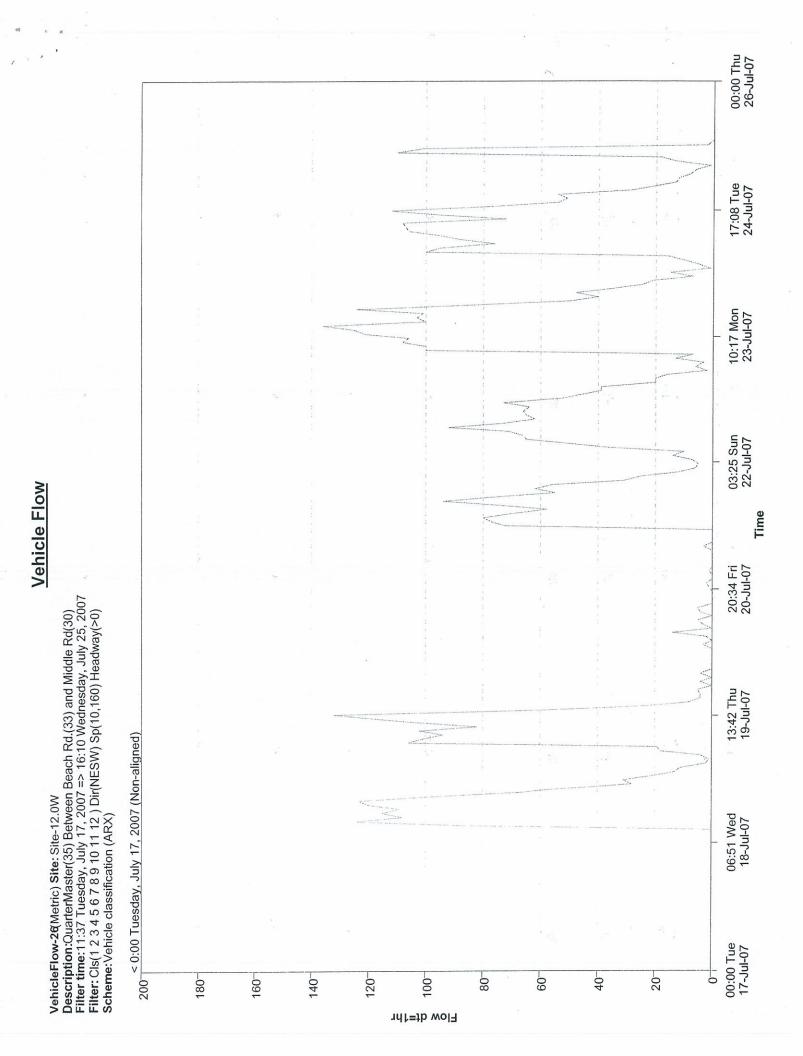
Description: Filter time:

QuarterMaster(35) Between Beach Rd.(33) and Middle Rd(30) 11:37 Tuesday, July 17, 2007 => 16:10 Wednesday, July 25, 2007 Vehicle classification (ARX)

Scheme: Filter:

	Mon 16 Jul	Tue 17 Jul	Wed 18 Jul	Thu 19 Jul	Fri 20 Jul	Sat 21 Jul	Sun 22 Jul	Average	s 1 - 7
	16 Jul	17 Jui	16 Jul	19 001	20 041	21 041	22 041		
Hour	*	*	0	13	4	0	25	5.7	8.4
0000-0100 0100-0200	*	*	0	11	0	1	12	3.7	4.8
0200-0300	*	*	0	2	0	0	6 1	0.7	1.6
0300-0400	*	*	.0	1	0	0	5 1	0.3	1.2
0400-0500	*	*	0	4	0	0	7 1	1.3	2.2
0500-0600	*	*	0	18	0	0	14	6.0	6.4
0600-0700	*	*	0	19	0	0	10 1	6.3	5.8
0700-0800	*	*	0	106<	3	3<	36 1	36.3	29.6
0800-0900	*	*	0	101	0	0	50	33.7	30.2
0900-1000	*	*	0	94	2	0	65	32.0	32.2
1000-1100	*	*	0	102	14<	0	66	38.7	36.4
1100-1200	*	0	86<	82	0	0	71<	42.0<	39.8<
1200-1300	*	0	124<	102	3	72	92<	57.3	65.5<
1300-1400	*	0	108	118	5	77	73	57.8	63.5
1400-1500	*	0	115	132<	0	80	62	61.8<	64.8
1500-1600	*	0	109	60	4	69	65	43.3	51.2
1600-1700	*	0	120	23	5<	58	66	37.0	45.3
1700-1800	*	0	123	8	0	74	64	32.8	44.8
1800-1900	*	0	.98	4	0	94<	73	25.5	44.8
1900-2000	*	0	66	4	0	77	53	17.5	33.3
2000-2100	*	0	51	5	0	55	46	14.0	26.2
2100-2200	*	0	28	0	1	62	39	7.3	21.7
2200-2300	*	0	31	4	2	56	39	9.3	22.0
2300-2400	*	0<	21	0	0	31	20	5.3	12.0
Totals									
0700-1900	*	*	883	932	36	527	783	497.9	548.2
0600-2200	*	*	1028	960	37	721	931	543.0	635.2
0600-0000	*	*	1080	964	39	808	990	557.5	669.2
0000-0000	*	*	1080	1013	43	809	1059	575.2	693.8
AM Peak	*	*	1100	0700	1000	0700	1100		
AM Peak	*	*	86	106	14	3	71		
DV D1-	*	2300	1200	1400	1600	1800	1200		
PM Peak	*	0	124	132	5	94	92		

<sup>\* -</sup> No data.



# MetroCount Traffic Executive Weekly Vehicle Counts

## WeeklyVehicle-23 -- English (ENU)

Datasets:

Site: [Site-11] Beach Rd.(33) North of QuarterMaster Rd(35)

Direction: 1 - North bound, A hit first., Lane: 0

Survey Duration: 11:32 Tuesday, July 17, 2007 => 15:58 Wednesday, July 25, 2007

File: C:\Program Files\MetroCount v316\User\Data\Site-1125Jul2007.EC0 (Regular)

Identifier: U832BH87 MC56-L5 [MC55] (c)Microcom 19Oct04

Algorithm: Factory default

Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 11:32 Tuesday, July 17, 2007 => 15:58 Wednesday, July 25, 2007

Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

**Speed range:** 10 - 160 km/h.

Direction: North, East, South, West (bound)

Separation: All - (Headway)
Name: Factory default profile
Scheme: Vehicle classification (ARX)

Units: Metric (meter, kilometer, m/s, km/h, kg, tonne)

In profile: Vehicles = 54851 / 54855 (99.99%)

WeeklyVehicle-23

Site:

Site-11.0N

Description:

Beach Rd.(33) North of QuarterMaster Rd(35)

Filter time:

11:32 Tuesday, July 17, 2007 => 15:58 Wednesday, July 25, 2007

Scheme:

Vehicle classification (ARX)

Filter:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	
	16 Jul	17 Jul	18 Jul	19 Jul	20 Jul	21 Jul	22 Jul	1 - 5	1 - 7
Hour	*	*	0	101	1.42	201	100	01 2	125 0
0000-0100	*	*	0	131	143	204	198	91.3	135.2
0100-0200		*	0	97	91	133	93	62.7	82.8
0200-0300	*		• 0	78	81	159	102	53.0	84.0
0300-0400	*	*	0	32	44	65	57	25.3	39.6
0400-0500	*	*	0	32	29	43	26	20.3	26.0
0500-0600	*	*	0	73	49	76	58	40.7	51.2
0600-0700	*	*	0	116	121	151	109	79.0	99.4
0700-0800	*	*	0	385	375	293	156	253.3	241.8
0800-0900	*	*	0	398	403	334	254	267.0	277.8
0900-1000	*	*	0	379	418	378	280		291.0
1000-1100	*	*	309	448	489	412	318		395.2<
1100-1200	*	0	491<	513<	548<	445<	326<		387.2
1200-1300	*	0	538	510	554	450	425	400.5	412.8
1300-1400	*	0	571	606	631	459	466	452.0	455.5
1400-1500	*	0	613	626	662	521<	433	475.3	475.8
1500-1600	*	0	549	509	595	405	390	413.3	408.0
1600-1700	*	0	612	629	650	411	397	472.8	449.8
1700-1800	*	0	697<	736<	784<	475	481<		528.8<
1800-1900	*	0	482	486	543	466	406	377.8	397.2
1900-2000	*	0	481	488	428	398	347	349.3	357.0
2000-2100	*	0	425	390	368	353	312	295.8	308.0
2100-2200	*	0	350	384	37.5	358	309	277.3	296.0
2200-2300	*	0	274	252	318	259	242	211.0	224.2
2300-2400	*	0<	213	170	222	232	159	151.3	166.0
Totals _									
0700-1900	*	*	4862	6225	6652	5049	4332	4735.1	4721.0
0600-2200	*	*	6118	7603	7944	6309	5409	5736.3	5781.4
0600-0000	*	*	6605	8025	8484	6800	5810	6098.6	6171.5
0000-0000	*	*	6605	8468	8921	7480	6344	6391.9	6590.3
AM Peak	*	*	1100	1100	1100	1100	1100		
	*	*	491	513	548	445	326		
PM Peak	*	2300	1700	1700	1700	1400	1700		
221 2001	*	0	697	736	784	521	481		

<sup>\* -</sup> No data.

WeeklyVehicle-23

Site:

Site-11.0N

Description:

Filter time:

Beach Rd.(33) North of QuarterMaster Rd(35) 11:32 Tuesday, July 17, 2007 => 15:58 Wednesday, July 25, 2007

Scheme:

Vehicle classification (ARX)

Filter:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	
	23 Jul	24 Jul	25 Jul	26 Jul	27 Jul	28 Jul	29 Jul	1 - 5	1 - 7
Hour									
0000-0100	105	105	132	*	*	*	*	114.0	114.0
0100-0200	65	61	80	*	*	*	*	68.7	68.7
0200-0300	65	74	64	*	*	*	*	67.7	67.7
0300-0400	35	27	26	*	*	*	*	29.3	29.3
0400-0500	24	22	27	*	*	*	*	24.3	24.3
0500-0600	48	50	34	*	*	*	* !	44.0	44.0
0600-0700	105	116	122	*	*	*	*	114.3	114.3
0700-0800	377	369	453<	*	*	*	*	399.7	399.7
0800-0900	396	400	416	*	*	*	*	404.0<	404.0<
0900-1000	433	376	78	*	*	*	* !	295.7	295.7
1000-1100	502<	402	0	*	*	*	*	301.3	301.3
1100-1200	490	473<	. 0	*	*	*	*	321.0	321.0
1200-1300	506	497	0	*	*	*	* 1	334.3	334.3
1300-1400	564	547	0	*	*	*	*	370.3	370.3
1400-1500	607	573	0	*	*	*	*	393.3	393.3
1500-1600	508	508	0	*	*	*	*	338.7	338.7
1600-1700	626	566	*	*	*	*	*	596.0	596.0
1700-1800	724<	728<	*	*	*	*	*	726.0<	726.0<
1800-1900	463	466	*	*	*	*	*	464.5	464.5
1900-2000	354	331	*	*	*	*	*	342.5	342.5
2000-2100	335	266	*	*	*	*	*	300.5	300.5
2100-2200	267	281	*	*	*	*	*	274.0	274.0
2200-2300	234	244	*	*	*	*	*	239.0	239.0
2300-2400	128	158	*	*	*	*	*	143.0	143.0
řie.									
Totals									
0700-1900	6196	5905	*	*	*	*	*	4944.8	4944.8
0600-2200	7257	6899	*	*	*	*	*	5976.2	5976.2
0600-0000	7619	7301	*	*	*	*	*	6358.2	6358.2
0000-0000	7961	7640	*	*	*	*	*	6706.2	6706.2
AM Peak	1000	1100	0700	*	*	*	*		
	502	473	453	*	*	*	*		
PM Peak	1700	1700	*	*	*	*	*		
	724	728	*	*	*	*	*		

<sup>\* -</sup> No data.

Vehicle Flow

## MetroCount Traffic Executive Weekly Vehicle Counts

### WeeklyVehicle-21 -- English (ENU)

Datasets:

= 7

Site: [Site-10] Middle Rd.(30) North of QuarterMaster Rd(35)

Direction: 3 - South bound, A hit first., Lane: 0

Survey Duration: 11:28 Tuesday, July 17, 2007 => 15:50 Wednesday, July 25, 2007

File: C:\Program Files\MetroCount v316\User\Data\Site-1025Jul2007.EC0 (Regular)

Identifier: U75173FE MC56-L5 [MC55] (c)Microcom 19Oct04

Algorithm: Factory default

Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 11:28 Tuesday, July 17, 2007 => 15:50 Wednesday, July 25, 2007

Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

**Speed range:** 10 - 160 km/h.

Direction: North, East, South, West (bound)

Separation: All - (Headway)
Name: Factory default profile
Scheme: Vehicle classification (ARX)

Units: Metric (meter, kilometer, m/s, km/h, kg, tonne)

In profile: Vehicles = 71662 / 72134 (99.35%)

WeeklyVehicle-21

Site:

Site-10.0S

Description:

Middle Rd.(30) North of QuarterMaster Rd(35)

Filter time:

11:28 Tuesday, July 17, 2007 => 15:50 Wednesday, July 25, 2007

Scheme:

Filter:

Vehicle classification (ARX) Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(>0)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	
	16 Jul	17 Jul :	18 Jul	19 Jul	20 Jul	21 Jul	22 Jul	1 - 5	, 1 - 7
Hour							100	00 7	129.2
0000-0100	*	*	0	120	161	185	180	93.7 53.0	80.0
0100-0200	*	*	0	86	73	119	122	40.0	64.8
0200-0300	*	*	0	54	66	111	93		37.2
0300-0400	*	*	0	25	29	61	71	18.0	31.8
0400-0500	*	*	0	26	39	52	42	21.7	
0500-0600	*	*	0	96	70	78	83	55.3	65.4 113.8
0600-0700	*	*	0	139	169	152	109	102.7	379.8
0700-0800	*	*	0	602	665	411	221	422.3	
0800-0900	*	*	0	640	695	545	346	445.0	445.2 473.2
0900-1000	*	*	0	627	719	618	402	448.7 <b>486.3</b> <	509.6
1000-1100	*	*	0	693	766	662	427		506.0
1100-1200	*	0	264<	705<	846<	668<	553<	453.8	565.5
1200-1300	*	0	632	698	878	701<	484	552.0	582.5
1300-1400	*	0	726	752	902	657	458	595.0	630.0
1400-1500	*	0	792	876	991<	627	494<	664.8	540.3
1500-1600	*	0	660	723	879	581	399	565.5	621.3
1600-1700	*	0	837	888<	953	573	477	669.5	643.8<
1700-1800	*	0	893<	869	990	639	472	688.0<	491.0
1800-1900	*	0	604	629	719	578	416	488.0	491.0
1900-2000	*	0	460	472	556	532	425	372.0	
2000-2100	*	0	396	369	417	372	351	295.5	317.5
2100-2200	*	0	336	333	410	372	325	269.8	296.0 230.3
2200-2300	*	0	256	271	299	274	282	206.5	176.2
2300-2400	*	0<	176	210	250	247	174	159.0	1/0.2
							1		
Totals									
0700-1900	*	*	5408	8702	10003	7260	5149	6478.8	6388.3
0600-2200	*	*	6600	10015	11555	8688	6359	7518.8	7523.1
0600-2200	*	*	7032	10496	12104	9209	6815	7884.3	7929.6
0000-0000	*	*	7032	10903	12542	9815	7406	8165.9	8338.0
0000-0000									
AM Peak	*	*	1100	1100	1100	1100	1100		
ILI LOUN	*	*	264	705	846	668	553		
PM Peak	*	2300	1700	1600	1400	1200	1400		
	*	0	893	888	991	701	494		

<sup>\* -</sup> No data.

WeeklyVehicle-21

Site:

Site-10.0S

Description:

Filter time:

Middle Rd.(30) North of QuarterMaster Rd(35) 11:28 Tuesday, July 17, 2007 => 15:50 Wednesday, July 25, 2007

Scheme:

Vehicle classification (ARX)

Filter:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	s 1 - 7
	23 Jul	24 Jul	25 Jul	26 Jul	27 Jul	28 Jul	29 Jul	1 - 5	1 - /
Hour				*	*	*	*	136.3	136.3
0000-0100	169	118	122	*	*	*	*	77.0	77.0
0100-0200	76	85	70	*	*	*	* 1	63.3	63.3
0200-0300	55	74	61	*	*	*	* *	37.0	37.0
0300-0400	41	26	44		*	*	* 1	27.3	27.3
0400-0500	30	31	21	*	*	*	^   *	71.3	71.3
0500-0600	71	72	71	*	*	*	*	157.3	157.3
0600-0700	162	151	159	*	*	*	*		
0700-0800	634	598	653<	*				628.3	628.3
0800-0900	707	655	618	*	*	*	*	660.0<	660.0<
0900-1000	778<	544	0	*	*	*	*	440.7	440.7
1000-1100	745	695	0	*	*		*	480.0	480.0
1100-1200	772	746<	0	*	*	*	*	506.0	506.0
1200-1300	745	781	0	*	*	*	*	508.7	508.7
1300-1400	819	821	0	*	*	*	*	546.7	546.7
1400-1500	864	858	• O	*	*	*	*	574.0	574.0
1500-1600	769	764	0	*	*	*	*	511.0	511.0
1600-1700	828	925<	*	*	*	*	*	876.5	876.5
1700-1800	892<	904	*	*	*	*	*	898.0<	898.0<
1800-1900	570	624	*	*	*	*	*	597.0	597.0
1900-2000	414	382	*	*	*	*	*	398.0	398.0
2000-2100	369	335	*	*	*	*	*	352.0	352.0
2100-2200	283	316	*	*	*	*	*	299.5	299.5
2200-2300	228	247	*	*	*	*	*	237.5	237.5
2300-2400	173	199	*	*	*	*	*	186.0	186.0
Totals									
									5005
0700-1900	9123	8915	*	*	*	*	*	7226.8	7226.8
0600-2200	10351	10099	*	*	*	*	*	8433.7	8433.7
0600-0000	10752	10545	*	*	*	*	*	8857.2	8857.2
0000-0000	11194	10951	*	*	*	*	*	9269.5	9269.5
AM Peak	0900	1100	0700	*	*	*	*		
	778	746	653	*	*	*	*		
DM Dook	1700	1600	*	*	*	*	*		
PM Peak	892	925	. *	*	*	*	*		
	032	323							

<sup>\* -</sup> No data.

Vehicle Flow

## MetroCount Traffic Executive Weekly Vehicle Counts

#### WeeklyVehicle-15 -- English (ENU)

Datasets:

Site: [Site-7] Middle Rd (30) South of Sugar King Rd (36)

Direction: 1 - North bound, A hit first., Lane: 0

Survey Duration: 12:09 Tuesday, July 17, 2007 => 15:19 Wednesday, July 25, 2007

File: C:\Program Files\MetroCount v316\User\Data\Site-725Jul2007.EC0 (Regular)

Identifier: U8700MBT MC56-L5 [MC55] (c)Microcom 19Oct04

Algorithm: Factory default

Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 12:09 Tuesday, July 17, 2007 => 15:19 Wednesday, July 25, 2007

Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Speed range: 10 - 160 km/h.

Direction: North, East, South, West (bound)

Separation: All - (Headway)
Name: Factory default profile
Scheme: Vehicle classification (ARX)

Units: Metric (meter, kilometer, m/s, km/h, kg, tonne)

In profile: Vehicles = 54089 / 54490 (99.26%)

WeeklyVehicle-15

Site:

Site-7.0N

Description:

Middle Rd (30) South of Sugar King Rd (36)

Filter time:

12:09 Tuesday, July 17, 2007 => 15:19 Wednesday, July 25, 2007

Scheme:

Filter:

Vehicle classification (ARX) Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(>0)

		Mon		Tue		Wed	10	Thu	00	Fri	21	Sat Jul	22	Sun Jul	Ave	rages		_	7
	16	Jul	17	Jul	18	Jul	19	Jul	20	Jul	21	Jul	22	Jul					'
Hour								0.1		101		156		124	61	.0	,	94.	1
0000-0100		*		*		0		91		61		100		72		.0		58.	
0100-0200		*		*		0		59		58		108		85		.0		60.	
0200-0300		*		*		0		50		30		50		68 I		.0		36.	
0300-0400		*		*		0		33		40		52		40		.7		32.	
0400-0500		*		*		0		31		66		90		76 1		.0		61.	
0500-0600		*		*		0		75 217		218		165		134	145			46.	
0600-0700		*		*		0		625		650		376		262		.0<		82.	
0700-0800		*				0		634<		615		458		342	416			09.	
0800-0900		*		*		0		577		577		507		375<				07.	
0900-1000				*		0		550		629		517		360	393			11.	
1000-1100		*		*		0<		559		655<		521<		331	404				2<
1100-1200						0		558		657		490		348	303			42.	
1200-1300		*		0		0		613		698		469		364	327			57.	
1300-1400				0				625<		716<		452		377		3.3<		60.	
1400-1500		*		0		592		560		667		461		337	449			32.	
1500-1600		*		0		572				669		473		325	468			45.	
1600-1700		*		0		585		618		708		513<		401	468				7<
1700-1800		*		0		599<		567		555		421		374	378			84.	
1800-1900		*		0		430		527		420		395		404<				38.	
1900-2000		*		0		409		401		367		298		337				70.	
2000-2100		*		0		304		318		322		260		270	207			26.	
2100-2200		*		0		257		252		238		235		194	162			79.	
2200-2300		*		0		209		202		205		184		148	118			34.	
2300-2400		*		0<		138		131		203		104		140				J 1 .	5
Totals																			
TOTALS _																			
0700-1900		*		*		2778		7013		7796		5658		4196	4902			10.	
0600-2200		*		*		3748		8201		9123		6776		5341	5810			93.	
0600-0000		*		*		4095		8534		9566		7195		5683	6090			07.	
0000-0000		*		*		4095		8873		9922		7751		6148	6322	2.6	65	50.	. 5
AM Peak		*		*		1100		0800		1100		1100		0900					
		*		*		0		634		655		521		375					
		*		2300		1700		1400		1400		1700		1900					
PM Peak		*		2300		599		625		716		513		404					
		^		U		333		023		. 10									

<sup>\* -</sup> No data.

WeeklyVehicle-15

Site:

Site-7.0N

Description:

Filter time:

Middle Rd (30) South of Sugar King Rd (36) 12:09 Tuesday, July 17, 2007 => 15:19 Wednesday, July 25, 2007

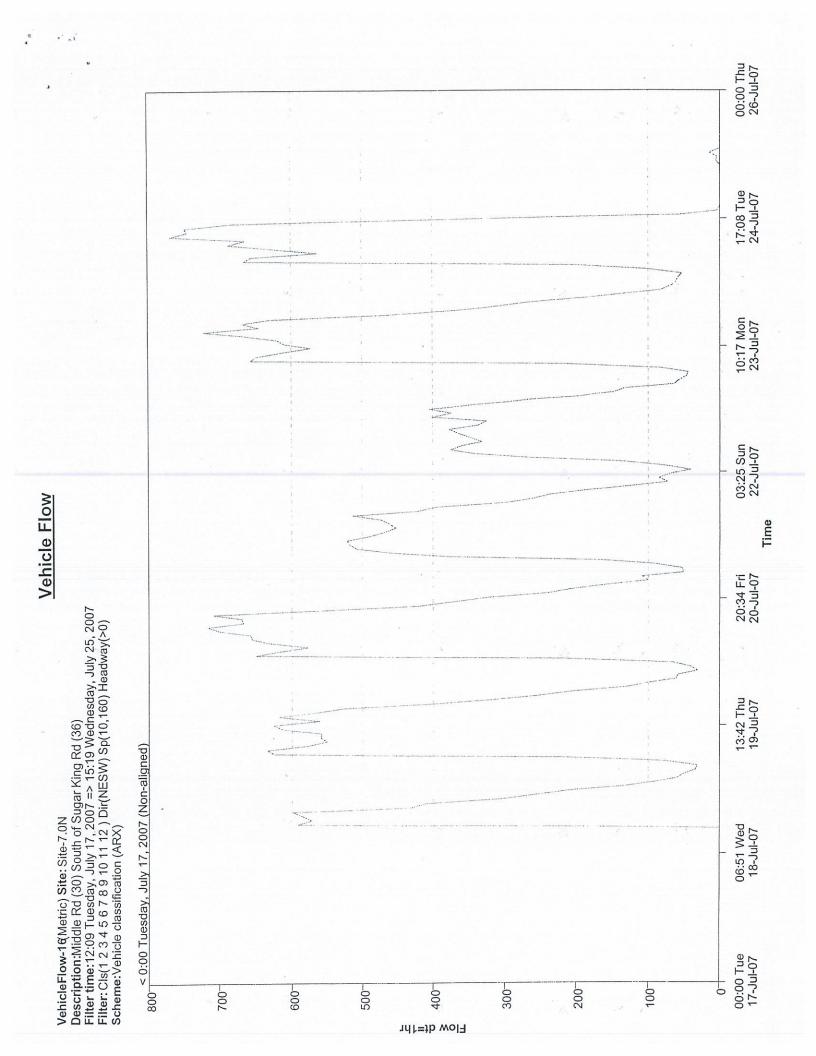
Scheme:

Vehicle classification (ARX)

Filter:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	
	23 Jul	24 Jul	25 Jul	26 Jul	27 Jul	28 Jul	29 Jul	1 - 5	1 - 7
Hour									
0000-0100	132	82	0	*	*	*	*	71.3	71.3
0100-0200	63	68	0	*	*	*	*	43.7	43.7
0200-0300	57	61	0	*	*	*	*	39.3	39.3
0300-0400	46	58	0	*	*	*	*	34.7	34.7
0400-0500	44	53	0	*	*	*	*	32.3	32.3
0500-0600	82	100	0	*	. *	*	*	60.7	60.7
0600-0700	222	200	0	*	*	*	*	140.7	140.7
0700-0800	656<	665	5	*	*	*	*	442.0<	442.0<
0800-0900	649	655	4	*	*	*	*	436.0	436.0
0900-1000	613	562	14<	*	*.	*	*	396.3	396.3
1000-1100	573	625	0	*	*	*	*	399.3	399.3
1100-1200	608	686<	0	*	*	*	*	431.3	431.3
1200-1300	620	664	0	*	*	*	*	428.0	428.0
1300-1400	664	768<	0	*	*	. *	*	477.3	477.3
1400-1500	721<	744	0	*	*	*	*	488.3	488.3
1500-1600	645	747	0	*	*	*	*	464.0	464.0
1600-1700	667	681	*	*	*	*	*	674.0<	674.0<
1700-1800	630	368	*	*	*	*	*	499.0	499.0
1800-1900	467	58	*	*	*	*	*	262.5	262.5
1900-2000	369	4	*	*	*	*	*	186.5	186.5
2000-2100	313	0	*	*	*	*	*	156.5	156.5
2100-2200	266	0	*	*	*	*	*	133.0	133.0
2200-2300	189	0	*	*	*	*	*	94.5	94.5
2300-2400	132	0	*	*	*	*	*	66.0	66.0
2500 2400	100								
Totals									
0700-1900	7513	7223	*	*	*	*	*	1 5398.2	5398.2
0600-2200	8683	7427	*	*	*	*	*	6014.8	6014.8
0600-2200	9004	7427	*	*	*	*	*	6175.3	6175.3
	9428	7849	*	*	*	*	*	6457.3	6457.3
0000-0000	9420	1049							0.07.0
AM Peak	0700	1100	0900	*	*	*	*		
	656	686	14	*	*	*	*		
						vorui (ilia			
PM Peak	1400	1300	*	*	*	*	*		
	721	768	*	*	*	*	*	,1	

<sup>-</sup> No data.



## MetroCount Traffic Executive **Weekly Vehicle Counts**

## WeeklyVehicle-17 -- English (ENU)

Datasets:

[Site-8] Beach rd.(33) South of Sugar King Rd. (36) Site:

1 - North bound, A hit first., Lane: 0 Direction:

11:19 Tuesday, July 17, 2007 => 15:33 Wednesday, July 25, 2007 Survey Duration:

C:\Program Files\MetroCount v316\User\Data\Site-825Jul2007.EC0 (Regular) File:

U74947WQ MC56-L5 [MC55] (c)Microcom 19Oct04 Identifier:

Factory default Algorithm:

Axle sensors - Paired (Class/Speed/Count) Data type:

Profile:

11:19 Tuesday, July 17, 2007 => 15:33 Wednesday, July 25, 2007 Filter time:

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 Included classes:

10 - 160 km/h. Speed range:

North, East, South, West (bound) Direction:

All - (Headway) Separation: Factory default profile Name: Vehicle classification (ARX) Scheme:

Metric (meter, kilometer, m/s, km/h, kg, tonne) Units:

Vehicles = 59002 / 59169 (99.72%) In profile:

WeeklyVehicle-17

Site:

Site-8.0N

Description:

Beach rd.(33) South of Sugar King Rd. (36)

Filter time:

11:19 Tuesday, July 17, 2007 => 15:33 Wednesday, July 25, 2007

Scheme:

Vehicle classification (ARX)

Filter:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	
	16 Jul	17 Jul	18 Jul	19 Jul	20 Jul	21 Jul	22 Jul	1 - 5	1 - 7
Hour						1.00	100	70 7	00 6
0000-0100	*	*	0	108	110	160	120	72.7	99.6
0100-0200	*	*	0	75	85	124	108	53.3	78.4 80.8
0200-0300	*	*	0	67	75	151	111	47.3	29.0
0300-0400	*	*	0	24	38	46	37	20.7	34.8
0400-0500	*	*	0	37	42	55	40	26.3	52.6
0500-0600	*	*	0	57	71	75	60	42.7	136.4
0600-0700	*	*	0	172	216	173	121	129.3	319.0
0700-0800	*	*	0	510	495	328	262	335.0 347.7	369.0
0800-0900	*	*	0	521	522	423	379	495.0	458.8
0900-1000	*	*	403	528<	554	445	364   <b>475&lt;</b>		508.2
1000-1100	*	*	506<	505	579	476<	380	428.3	362.5
1100-1200	*	0	474	527	712<	82 <b>536&lt;</b>	490 I	478.3	489.8
1200-1300	*	0	635	608	670	496	490	340.5	390.7
1300-1400	*	0	638	571	153	515	485	462.3	474.8
1400-1500	*	0	609	624	616		439	377.3	408.2
1500-1600	*	0	243	690	576	501 513	439	392.5	416.5
1600-1700	*	0	180	673	717		531<		526.2<
1700-1800	*	0	645<	709<	746<		431	432.5	447.0
1800-1900	*	0	538	590	602	521	15	432.5	367.8
1900-2000	*	0	625	594	527	446	373	340.0	349.7
2000-2100	*	0	491	416	453	365		283.5	311.8
2100-2200	*	0	396	315	423	464	273   212	216.8	229.8
2200-2300	*	0	249	266	352	300	153	153.0	166.5
2300-2400	*	0<	189	164	259	234	153	153.0	100.5
Totals	18								
0700-1900	*	*	4871	7056	6942	5362	5138	5144.2	5170.7
0600-2200	*	*	6383	8553	8561	6810	5920	6333.5	6336.4
0600-2200	*	*	6821	8983	9172	7344	6285	6703.3	6732.7
0000-0000	*	*	6821	9351	9593	7955	6761 I	6966.3	7107.9
0000-0000			0021	3331	3030		i		
AM Peak	*	*	1000	0900	1100	1000	1000		
Ar reak	*	*	506	528	712	476	475		
PM Peak	*	2300	1700	1700	1700	1200	1700		
	*	0	645	709	746	536	531		

<sup>\* -</sup> No data.

WeeklyVehicle-17

Site:

Site-8.0N

Description:

Filter time:

Beach rd.(33) South of Sugar King Rd. (36) 11:19 Tuesday, July 17, 2007 => 15:33 Wednesday, July 25, 2007

Scheme:

Vehicle classification (ARX)

Filter:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	s
	23 Jul	24 Jul	25 Jul	26 Jul	27 Jul	28 Jul	29 Jul	1 - 5	1 - 7
Hour									
0000-0100	95	108	75	*	*	*	*	92.7	92.7
0100-0200	75	65	90	*	*	*	*	76.7	76.7
0200-0300	72	70	54	*	*	*	*	65.3	65.3
0300-0400	28	27	29	*	*	*	*	28.0	28.0
0400-0500	39	28	26	*	*	*	*	31.0	31.0
0500-0600	60	69	61	*	*	*	*	63.3	63.3
0600-0700	188	149	194	*	*	*	*	177.0	177.0
0700-0800	482	487	466<	*	*	*	*	478.3<	478.3<
0800-0900	519	462	209	*	*	*	*	396.7	396.7
0900-1000	509	480	0	*	*	*	*	329.7	329.7
1000-1100	608<	525<	0	*	*	*	*	377.7	377.7
1100-1200	564	296	0	*	*	* *	*	286.7	286.7
1200-1300	635	580	0	*	*	*	*	405.0	405.0
1300-1400	630	590	0	*	*	*	*	406.7	406.7
1400-1500	621	639	0	*	*	*	*	420.0	420.0
1500-1600	624	663<	0	*	*	*	*	429.0	429.0
1600-1700	649	633	*	*	*	*	*	641.0	641.0
1700-1800	685<	614	*	*	*	*	*	649.5<	649.5<
1800-1900	485	470	*	*	*	*	*	477.5	477.5
1900-2000	336	473	*	*	*	*	*	404.5	404.5
2000-2100	268	379	*	*	*	*	*	323.5	323.5
2100-2200	308	309	*	*	*	*	*	308.5	308.5
2200-2300	230	189	*	*	*	*	. *	209.5	209.5
2300-2400	142	160	*	*	*	*	*	151.0	151.0
2500 2400									
Totals									
									5005 5
0700-1900	7011	6439	*	*	*	*	*	5297.7	5297.7
0600-2200	8111	7749	*	*	*	*	*	6511.2	6511.2
0600-0000	8483	8098	*	*	*	*	*	6871.7	6871.7
0000-0000	8852	8465	*	*	*	*	*	7228.7	7228.7
		1000	0700	*	*	*	*		
AM Peak	1000	1000	0700 466	*	*	*	*		
	608	525	400	•					
PM Peak	1700	1500	*	*	*	*	*		
rm reak	685	663	*	*	*	*	*		
	000								

<sup>\* -</sup> No data.

## **MetroCount Traffic Executive Weekly Vehicle Counts**

## WeeklyVehicle-19 -- English (ENU)

Datasets:

Site:

[Site-9] Gualo Rai (311),between middle rd. to beach rd

Direction:

4 - West bound, A hit first., Lane: 0

Survey Duration:

11:24 Tuesday, July 17, 2007 => 15:45 Wednesday, July 25, 2007

File:

C:\Program Files\MetroCount v316\User\Data\Site-925Jul2007.EC0 (Regular)

Identifier:

U838YAFH MC56-L5 [MC55] (c)Microcom 19Oct04

Algorithm:

Factory default

Data type:

Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:

11:24 Tuesday, July 17, 2007 => 15:45 Wednesday, July 25, 2007

Included classes:

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Speed range:

10 - 160 km/h.

Direction:

North, East, South, West (bound)

Separation:

Name:

All - (Headway) Factory default profile

Scheme:

Vehicle classification (ARX)

Units:

Metric (meter, kilometer, m/s, km/h, kg, tonne)

In profile:

Vehicles = 2876 / 3033 (94.82%)

WeeklyVehicle-19

Site:

Site-9.0W

Description:

Gualo Rai (311),between middle rd. to beach rd 11:24 Tuesday, July 17, 2007 => 15:45 Wednesday, July 25, 2007

Filter time: Scheme:

Vehicle classification (ARX)

Filter:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average	
	16 Jul	17 Jul :	18 Jul	19 Jul	20 Jul	21 Jul	22 Jul	1 - 5	1 - 7
Hour						_	2	F 2	1.0
0000-0100	*	*	0	10	6	5	3	5.3	4.8
0100-0200	*	*	0	5	4	5	6	0.0	2.0
0200-0300	*	*	0	0	0	6	4   0	1.0	1.0
0300-0400	*	*	0	3	0	2		1.0	1.0
0400-0500	*	*	0	1	2	0	2   2	1.7	2.0
0500-0600	*	*	0	1	4	3	5 1	2.3	3.4
0600-0700	*	*	0	4	3	5	6 1	13.0	11.8
0700-0800	*	*	0	16	23	14	13	14.0	16.4
0800-0900	*	*	0	22	20	27	14	24.0	21.4
0900-1000	*	*	13	36	23 <b>29&lt;</b>	21 24	17<	29.7<	26.0<
1000-1100	*	*	28<	32	29<	30<	16	23.0	23.0
1100-1200	*	0	25	40<		17	17	24.3	21.8
1200-1300	*	0	36	33	28	14	17	26.5	22.8
1300-1400	*	0	34	41<	31		20	27.8	25.5
1400-1500	*	0	34	31	46	22 18	13	30.5	25.5
1500-1600	*	0	47<	34	41		15	28.8	26.5
1600-1700	*	0	34	40	41	29	24<	30.5<	27.8<
1700-1800	*	0	41	27	54<	21		16.8	16.2
1800-1900	*	0	18	23	26	11	19   16	13.8	14.7
1900-2000	*	0	20	19	16	17		9.8	11.3
2000-2100	*	0	16	12	11	15	14   6		18.2
2100-2200	*	0	11	12	18	62<		10.3	11.0
2200-2300	*	0	9	8	14	29	6 I	4.8	5.2
2300-2400	*	0<	9	2	8	6	0	4.8	3.2
Totals									
			210	375	389	248	191	288.7	264.8
0700-1900	*	*	310	422	437	347	232	324.8	312.3
0600-2200	*	*	357		457	382	244	337.3	328.5
0600-0000	*	*	375	432	475	403	261	349.3	343.3
0000-0000	*	*	375	452	475	403	201	349.3	343.3
AM Peak	*	*	1000	1100	1000	1100	1000 i		
Ar reak	*	*	28	40	29	30	17		
DM Dook	*	2300	1500	1300	1700	2100	1700		
PM Peak	*	0	47	41	54	62	24		

<sup>\* -</sup> No data.

WeeklyVehicle-19

Site:

Site-9.0W

Description:

Filter time:

Gualo Rai (311),between middle rd. to beach rd 11:24 Tuesday, July 17, 2007 => 15:45 Wednesday, July 25, 2007

Scheme:

Filter:

Vehicle classification (ARX) Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(>0)

	Mon	Tue	Wed	Thu	Fri	<u>Sat</u> 28 Jul	Sun	Average	
	23 Jul	24 Jul	25 Jul	26 Jul	27 Jul	28 Jul	29 Jul	1 - 5	1 - 7
Hour			0	*	*	*	*	2.3	2.3
0000-0100	1	4	2	*	*	*	*	3.3	3.3
0100-0200	5	4	1	*	*	*	*	4.0	4.0
0200-0300	4	3	5	*	*	*	* 1	0.7	0.7
0300-0400	2	0	0	*	*	*	* 1	1.7	1.7
0400-0500	1	1	3	*	*	*	* 1	0.7	0.7
0500-0600	1	1	0	*	*	*	*	5.0	5.0
0600-0700	3	6	6	*	*	* *	*	17.0	17.0
0700-0800	17	14	20<	*	*	*	* 1	20.3	20.3
0800-0900	21	25	15	*	*	*	^ ! * !	16.7	16.7
0900-1000	32	18	0	*	*	*	*	21.3	21.3
1000-1100	35	29	0	*	*	*	*	23.3<	23.3<
1100-1200	35<	35<	0	*	*	*	*	19.7	19.7
1200-1300	32	27	0	*	*	*	*	18.3	18.3
1300-1400	32	23	0	*	*	*	~ ! * !	20.3	20.3
1400-1500	31	30	0	*	•	*	^   *	19.7	19.7
1500-1600	34	25	0	*	*	*	^   *	37.5	37.5
1600-1700	41	34	*	*	*	*	* 1	41.5<	41.5<
1700-1800	45<	38<		*	*	*	^   *	25.0	25.0
1800-1900	30	20	*	*	*	*	* 1	21.0	21.0
1900-2000	24	18	*	*	*	*	*	15.0	15.0
2000-2100	14	16	*	*	*	*	^   *	6.5	6.5
2100-2200	7	6		*	*	*	^   *	13.5	13.5
2200-2300	13	14	*	*	*	*	^   *	3.5	3.5
2300-2400	1	6	*	*	^	^-		3.5	3.3
Totals _									
0700-1900	385	318	*	*	*	*	*	280.7	280.7
0600-2200	433	364	*	*	*	*	*	328.2	328.2
0600-0000	447	384	*	*	*	*	*	345.2	345.2
0000-0000	461	397	*	*	*	*	*	357.8	357.8
AM Peak	1100	1100	0700	*	*	*	*		
AM reak	35	35	20	*	*	*	*		9
PM Peak	1700	1700	*	*	*	*	*		
	45	38	*	*	*	*	*		

<sup>\* -</sup> No data.

Appendix C USFWS Reports

FINAL COORDINATION ACT REPORT

GARAPAN FLOOD CONTROL STUDY

SAIPAN, COMMONWEALTH OF

THE NORTHERN MARIANA ISLANDS

Description of Fraject Area. . . . .

UNITED STATES DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE

HONOLULU FIELD OFFICE

July 1985

Prepared for the U.S. Army Engineer District, Honolulu

#### PREFACE

This report was prepared by John Ford, Andy Yuen, and Yvonne Ching, and is based on data gathered from existing literature and from Service field investigations conducted by Thomas Hablett, and Peggy Kohl from April 30 to May 11, 1979; and Gerald Ludwig, by John Ford and Commonwealth of the Northern Mariana Islands (CNMI) biologists on November 20, 1984. Data from Service forest bird surveys were provided by John Engbring, Supervisory Wildlife Project alternatives were provided by Rudy Biologist. Planning Branch. Engineering Division, Honolulu District. wish to acknowledge Drs. Tom Lemke and Thane Pratt Division of Fish and Wildlife for their excellent logistical and field support, and for their assistance in impact identification and analysis. We also gratefully thank Mr. Nicholas Guerrero, Director of the CNMI Department of Natural Resources.

#### DESCRIPTION OF PROJECT AREA

Garapan village is located on Saipan's west-central coast (Fig. 1). Prior to its nearly complete destruction during World War II, it was the principal population center on Saipan. Extensive rebuilding was completed after invasion by U. S. forces to facilitate administrative services and storage of war-related materials. Since the late 1940's, most of the U. S. military buildings have deteriorated or have been replaced by residential or light commercial buildings. Garapan is also the site of three major hotels. These are located along the white sand Micro Beach that borders Saipan Lagoon.

Inland from this coastal plain area, the land rapidly rises in a series of terraces that form Saipan's central limestone hill range. Mt. Tagpachau, Saipan's highest elevation (1,555 feet), is about 2.5 miles southeast of the village. The slopes of the geologically complex Tagpachau limestone ridge are dissected by steep ravines and occasional nearly vertical fault cliffs (Ref. 2). The narrow ravines and areas along the cliffs appear to have been shrub or forest vegetation in 1944. Many of the remaining terraces were cleared and cultivated in what appears to be sugar cane. Aerial photographs from 1978 show little evidence of farming along the slopes above Garapan.

There are no perennial streams within the project area. Deep valleys on the hillsides contain intermittent stream channels. The watershed within the project area covers 1.9 square miles (Ref. 15 and 16). Three wetland areas totalling about 32.1 acres in area are present within the Garapan watershed (Fig. 3). The largest is located in the American Memorial Park, just southwest of Tanapag Harbor (Fig. 3). This wetland covers an area of

Alternative C is similar to Alternative B except that the 1,800-foot long outlet channel would run along the Island Power Road (Fig. 5). The outlet channel would discharge into Saipan Lagoon south of the Hafa Adai Hotel. The channel would be trapezoidal in shape and would be riprap lined in areas of high water velocities. This alternative would affect 27 private lots and would require the relocation of 5 residences.

Alternative D has the same upland channel location as Alternative A (Fig. 6). This alternative would use the main Garapan wetland as a ponding basin for flood flows. The maximum storage capacity within the area is about 112 acre-feet over an area of 43 acres. The wetland would be graded to connect the ponds and create one large pond. The outflow channel would have an invert elevation set at +2.00 feet above mean sea level. The flood waters would discharge into Tanapag Harbor through four box culverts at Beach Road.

Alternative E has the same upland channel location as Alternative A (Fig. 7). However, the outlet channel is about 500 feet longer and detours around the main Garapan wetland. Flood waters would discharge into Tanapag Harbor.

Alternative F is a non-structural alternative that would require the permanent relocation of people and contents from flood prone areas or flood proofing buildings in the flood zone.

## TERRESTRIAL AND AQUATIC RESOURCES WITHOUT THE PROJECT

Previously cleared areas in the Garapan watershed have been revegetated with nearly pure stands of tangantangan (Leucaena leucocephala). The closed tangantangan canopy is 15-20 feet high and dense enough to inhibit extensive undergrowth in the more xeric hillside habitats. Ravines, however, have deeper soils that retain water better than the slopes. In these areas, undergrowth is more diversified with dense areas of grasses and tigre (Sansevieria trifasciata). Pago (Hibiscus tiliaceus), papao-apaka (Alocasia macrorrhiza) and kafu (Pandanus fragans) are also important constituents of the damper tangantangan areas. Dominant vegetation observed in the Garapan watershed is listed in Appendix 1.

The remaining forest vegetation is generally dominated by a mixture of introduced food or ornamental trees along with kafu, bamboo (Bambusa vulgaris), pago and ironwood (Casuarina litorea). Typical strand vegetation observed along the beach includes the beach morning glory (Ipomoea pes-caprae), pago, coconut (Cocos nucifera), ironwood and various grasses and shrubs. Urban vegetation includes many of the previously mentioned species as well as the flame tree (Delonix regia), a variety of garden vegetables and ornamental shrubs.

tidal flats along the shoreline of the lagoon. Lemke (1983, unpublished) listed six species of wading birds and 14 species of migratory shorebirds known from Saipan. Most of these species utilize the tidal flats adjacent to the American Memorial Park as resting and foraging habitat (Figure 16).

The Common Moorhen, Mariana Mallard (Anas oustaleti), Nightingale Reed Warbler, La Perouse's Megapode (Megapodius laperouse), and Vanikoro Swiftlet are listed endangered species. Although no endangered Micronesian Megapodes have been recorded from the Garapan watershed, a small population exists on Northern Saipan (Ref. 6). The upper Garapan watershed may be suitable habitat for this bird.

Marianas fruit bat (<u>Pteropus mariannus mariannus</u>) may be present in this area, but was not observed during the 1979 survey (Ref. 19). At one time, the endangered Mariana Mallard may have been found in the wetlands of the lower watershed; however, it is not known to reside there now.

Two Common Moorhens, a Black-Crowned Night Heron (Nycticorax nycticorax), two Mariana Fruit-Doves, two Nightingale Reed Warblers, and four Rufous Fronted Fantails were observed within the American Memorial Park wetland by Service and CNMI biologists during their survey on November 20, 1984.

A standing water body within the American Memorial Park provides a curious habitat for an estuarine fish. The small pond is linked with Tanapag Harbor by a drainage culvert during freshets. Apparently during these events, juveniles Megalops cyprinoides migrate into the pond and become trapped there by receding flows. At least 3 large adults (1.5 to 2 ft. in length) were observed in the shallow stagnant pond by Service and CNMI biologists in November 1984.

The nearshore marine environment within the study area can be generally described as sandy algae-sea grass (Enhalus acoroides and Halophila minor) habitat (Appendix 4) that is inhabited by at least 31 species of fish (Appendix 5) and an unknown variety of invertebrates (Ref. 1 and 19). The dock and shoreline substrate the southern boundary of the site is rubble that appears to have resulted from previous dredging and deterioration of the dock and shoreline seawall. The rubble along the outer edge of the basin is often exposed at low tide. This habitat (Fig. 8) (Table 1) is frequented by schools of cardinal fish, juvenile squirrel fish, damselfish, surgeonfish, rabbitfish, snappers, goatfish, an occasional eel and a variety of gobies and blennies (Appendix 5). Approximately 5% of the bottom is covered with living coral (Pocillopora damicornis). The bottom of the dredged area is sandy and is about 90% covered by a variety of algae and sea grasses.

Besides A. formosa, the most obvious invertebrates present were sea cucumbers (0.5 per m2) (Fig. 11) found on sandy substrate between coral growths. Species observed included Holothuria atra (most common), H. axiologa, H. edulis, Synapta maculata, and Bohadchia argus. Also present were unidentified invertebrates including crabs, a variety of sponges (Fig. 12), hydrozoan corals, bryozoans, and various worms.

These patch reefs apparently represent a unique environment within Saipan Lagoon (Fig. 4). Amesbury et al (Ref. 1) highly recommended preservation of this area because of the great diversity of fish species present. Interviews with boat operators that cater to tourist skin divers indicated that this spot is highly valuable to them because of its beauty, easy accessibility, and safety. Threatened Green Sea Turtles (Chelonia mydas) and Endangered Hawksbill Turtles (Eretmochelysimbricata) are occasionally observed on the reef off Garapan Dock (Ref. 21).

The northern site for the outlet channel near the American Memorial Park, is presently being used as a small boat harbor (Fig. 13). Its protected nature and proximity to hotels and to Managasan Island make it a prime site for tour boats, three of which were present during the 1979 survey. The site also serves as a mooring area for pleasure crafts.

Erosion of coral fill, in areas where sheet piling and wood retaining walls have deteriorated, has resulted in excessive turbidity. Poor visibility made the site difficult to survey during 1979.

Most of the substrate is sand, silt or rubble with occasional small corals. The bottom has an abundance of scrap metal and other debris, possibly artifacts from World War II. A wrecked World War II barge was present at the harbor entrance. A small boat harbor under construction at the time of the American invasion lies just north of the entrance. The remains of many landing crafts, reminders of World War II, are strewn across the nearby reef (Fig. 14) and around Garapan Dock.

Benthic marine vegetation is primarily <u>Halimeda</u> spp., <u>Padina</u> spp. with scattered <u>Sargassum</u> spp., <u>Halodule uninervis</u>, and <u>Enhalus acoroides</u> (Table 4). Deeper into the anchorage, murky water prevented an accurate estimation of vegetation cover, but <u>Halimeda</u> spp. and <u>Padina</u> spp. appeared to be dominant. Sea cucumbers, most likely <u>Holothuria</u> atra, were scattered across the bottom. The most common invertebrates along the shore were neritid and littorine mollusks.

A concern discussed in our draft 2(b) Coordination Act Report (February 25, 1985) was that the periodic introduction of flood waters into the marsh would reduce the salinity of the marsh waters and would negatively affect the wetland fern Acrostichum aureum and other components of the endangered Mariana Gallinule habitat.

Our report stated that the fern A. aureum flourishes in brackish water wetlands. The fern is not an obligate brackish water plant and flourishes in both freshwater and brackish water wetlands (D. Herbst, pers. comm.). This fern is tolerant of brackish water and has been found on the landward edge of mangroves swamps and in other mixohaline coastal wetlands.

The decrease in salinity of marsh waters would be temporary since the outflow time for 112 acre-feet would range from 3.7 to 5.0 hours. The reduction in salinity in the wetland resulting from the periodic flood water input would not have an adverse effect on  $\underline{\mathbf{A}}$ .  $\underline{\mathbf{aureum}}$  or the other vegetation components of the Garapan Marsh.

The use of the Garapan Marsh as a flooding basin does have the potential for introducing and bioaccumulating toxic substances in wetland fauna. Urban growth within the watershed may introduce petrochemicals, biocides, and other hazardous materials to the wetland.

Relative to the other alternatives, this alternative would result in a lower suspended sediment load being introduced into Tanapag Harbor because of the ponding and settling effects within the Garapan Marsh. This would result in a reduced impact to nearshore water quality and seagrass beds.

The removal of the asphalt fill areas in the Garapan wetland would require the construction of temporary causeways into the marsh. This construction would have temporary negative impacts on wetland vegetation and waterbird habitats. However, the removal of the asphalt fill would result in a net gain of wetland and waterbird habitat by removing fast lands within the wetland. From a wildlife standpoint, however, the removal of the fill is not necessary.

#### Alternative Plan E

In our draft 2(b) Coordination Act Report, the Service stated that the drainage channel alternative that skirted the marsh would have the least adverse impact on the Garapan wetland. An important qualifier to this recommendation was that the drainage channel be impervious to prevent sea water intrusion into the drainage channel and thereby increasing the salinity of the Garapan wetland. An impervious channel is necessary to maintain the existing water conditions within this wetland (Chuck Huxler, U.S. Geological Survey, pers. comm.).

#### U.S. FISH AND WILDLIFE MITIGATION POLICY

The Service's Mitigation Policy (Federal Register, Vol. 46, No. 15, January 23, 1981) was formulated with the intent to ". protect and conserve the most important and valuable fish wildlife resources while facilitating balanced development of the Nation's natural resources." The policy outlines internal guidance for Service staff and complements our participation under the Fish and Wildlife Coordination Act and National The Mitigation Policy does not apply Environmental Policy Act. to threatened or endangered species; specific requirements for these resources are covered in the Endangered Species Act of 1973 (50 CFR 17).

The policy focuses on the mitigation of habitat value, and on impacts to fish and wildlife populations. Our recommendations for mitigation/compensation will be based upon the habitat values adversely affected by the project, and not by loss of acreage alone. Our habitat valuations and recommendations will be based upon thorough consideration of all relevant biological data.

The Service considers the Garapan Marsh to be Resource Category 2. Under this category, the habitat to be impacted is of high value for the evaluation species and is relatively scarce or becoming scarce on a national basis or in the ecoregion setting. for this category is no net loss of in-kind mitigation goal habitat value. Specific planning goals include (1) physical modification of the replacement habitat to convert it to the same restoration or rehabilitation of previously type lost; (2) (3) increased management of similar replacement altered habitat; habitat so that the in-kind habitat value of the lost habitat is replaced; or (4) a combination of the above.

The evaluation species were various migratory waterfowl including the Green-winged Teal (Anas creca), Northern Pintail (A. acuta), Garganey (A. querquedula), Northern Shoveler (A. clypeata), and Tufted Duck (Aythya fuligula) and migratory shorebirds including the Lesser Golden Plover (Pluvialis dominica), Common Greenshank (Tringa nebularia), Marsh sandpiper (T. stagnatilis), Wood Sandpiper (T. glareola), Gray-tailed Tattler (Heteroscelus brevipes), Bar-tailed Godwit (Limosa lapponica), and others (J. Engbring, pers. comm.).

#### RECOMMENDATIONS

- a. From the mouth of the channel to Station 44 + 98, the drainage channel will be impervious to seawater intrusion. This impervious channel is necessary to maintain the existing water quality conditions within the Garapan Marsh.
- b. If the Corps determines that an impervious channel for Alternative E is economically unfeasible, the Service recommends the selection of Alternative D.

### **BIBLIOGRAPHY**

- 1. Amesbury, S. S., D. R. Lassuy, R. F. Myers and V. Tyndzik. 1979. A Survey of the Fish Resources of Saipan Lagoon. Univ. of Guam Marine Laboratory. Techn. Report No. 52.
- 2. Cloud, Jr., P. E., R. G. Schmidt, H. W. Burke. 1956. Geology of Saipan, Mariana Islands. U. S. Department of Interior, Geological Survey. Prof. Pap. 280. 445 pp.
- 3. Darnel, R. M., W. E. Pequegnat, B. M. James, F. J. Benson and R. A. Defenbaugh. 1976. Impacts of Construction Activities in Wetlands of the United States. U. S. Environmental Protection Agency. EPA-600/3-76-045. Corvallis, OR.
- 4. Davis, D. 1970. Draft Topographical Map of Saipan. U. S. Department of Interior, Geological Survey, Honolulu Office.
- 5. Doty, J. E. and J. A. Marsh, Jr. 1977. Marine Survey of Tanapag, Saipan: the Power Barge "Impedance". Univ. of Guam Marine Laboratory. Techn. Report No. 33.
- 6. Engbring, J. and F. Ramsey. In preparation. Pacific Islands Forest Bird survey: Saipan, Tinian, Agiguan and Rota. U. S. Fish and Wildlife Service.
- 7. FitzGerald, Jr., W. J. and W. J. Tobias. 1974. Marine Survey of Saipan Lagoon. A preliminary survey of the marine plants of Saipan Lagoon. Univ. of Guam Marine Laboratory. Environmental Survey Report No. 17.
- 8. Huxel, Jr., C. J. 1978. Floods Resulting From Tropical Storm Carmen on Saipan. U. S. Geological Survey, Water-Resources Investigations.
- 9. Juan C. Tenorio and Associates, Inc. 1979. Ornithological Survey of Wetlands in Guam, Saipan, Tinian and Pagan. Prepared for Corps of Engineers, Pacific Ocean Division. Contract No. DACW 84-78-C-00031.
- 10. Johnson, R. R. and J. F. McCormick (Coord.). 1979. Strategies for Protection and Management of Floodplain, Wetland and Other Riparian Ecosystems. U. S. Department of Agriculture Forest Service. General Technical Report WO-12. Washington, D. C.
- 11. M and E Pacific, Inc. 1980. Saipan Lagoon Circulation Study. Prepared for U. S. Army Corps of Engineers.
- 12. Owens, R. P. 1988. A Checklist of the Birds of Micronesia. Micronesica 13(1):65-81.
- 13. Shallenberger, R. J. and J. I. Ford. 1978. Report: Field Trip to Guam and Saipan, 13-23 December 1978. U. S. Fish and Wildlife Service.

## Appendix 1. Dominant plants observed in the Garapan Drainage during 1979 Service surveys (Ref. 19).

#### COMMON NAME

#### SCIENTIFIC NAME

#### MONOCOTYLEDONS

Bamboo
Banana
Betel nut
Coconut
Crowfoot grass
Guinea grass
Kafu
Lovegrass
Rat-tail dropseed
Sedge
Sword grass
Tigre
Upland taro (papao-apaka)

Bambusa vulgaris

Musa xparadisiaca

Areca cathecu
Cocos nucifera
Dactyloctenium aegyptium
Panicum maximum
Pandanas fragans
Eragrostis tenella
Sporobolus elongatus
Cyperus odoratus
Miscanthus floridulus
Sansevieria trifasciata
Alocasia macrorrhiza

#### DICOTYLEDONS

Acacia African tulip tree Beach morning glory Breadfruit Candlebrush Coffee-senna False verbena Flame tree Indian pluchea Ironwood Kapok tree Lagundi Mango Milo Nigas Pago Papaya Passion fruit

Tangan tangan

Acacia confusa Spathodea campanulata Ipomoea pes-caprae Artocarpus incisus or mariannensi: Cassia alata Cassia occidentalis Stachytarpheta indica Delonix regia Pluchea indica Casuarina litorea Ceiba pentandra Vitex trifolia Mangifera indica Thespesia populnea Pemphis acidula Hibiscus tiliaceus Carica papaya Passiflora foetida var. hispida Leucaena leucocophala

Appendix 3.

THE PERSON

اليغوي بوب

Birds observed in the Garapan Drainage during Service surveys by Gerald Ludwig in May of 1979 (Ref. 19) and by Engbring & Ramsey in 1982 (Ref. 6). A number of other migratory shorebirds would be expected to occur on reef flats along the coast. Nomenclature is based on Owens, 1977 (Ref. 12).

#### COMMON NAME

Yellow Bittern Marianas Crow Marianas Fruit-Dove Philippine Turtle-Dove White-throated Ground-Dove Rufous-fronted Fantail Red Junglefowl Cardinal Honeyeater Golden Honeyeater Collared Kingfisher Common Moorhen Rock Pigeon Lesser Golden Plover Nightingale Reed-Warbler Common Sandpiper Wood Sandpiper Eurasian Tree Sparrow Micronesian Starling Vanikoro Swiftlet Gray-tailed Tattler Wandering Tattler White Tern Ruddy Turnstone Bridled White-eye

### SCIENTIFIC NAME

Ixobrychus sinensis Corvus kubaryi Ptilinopus roseicapilla Streptopelia bitorquata Gallicolumba xanthonura Rhipidura rufifrons Gallus gallus Myzomela cardinalis Cleptornis marchei Halcyon chloris Gallinula chloropus Columba livia Pluvialis dominica Acrocephalus luscinia Actitis hypoleucos Tringa glareola Passer montanus Aplonis opaca Collocalia vanikorensis Heteroscelus brevipes Heteroscelus incanus Gygis alba Arenaria interpres Zosterops conspicillata

USEVS Plagning Aid Letter for Saipun smail best Bartier

<sup>1</sup> Unconfirmed record

Fishes recorded from offshore habitats near alternative sites Appendix 5. for Garapan Flood Control Study by USFWS biologists, 1979 and Amesbury et al., 1979 (Ref. 1).

> <sup>1</sup>Habitats sampled by Amesbury <u>et al</u>. Habitat description in Table 1 and Fig. 4.

<sup>2</sup>Collection sites of FWS biologists:

GR - Garapan Reef, includes Amesbury's habitat types 7, 11, 15

GD - Garapan Dock, includes Amesbury's habitat types

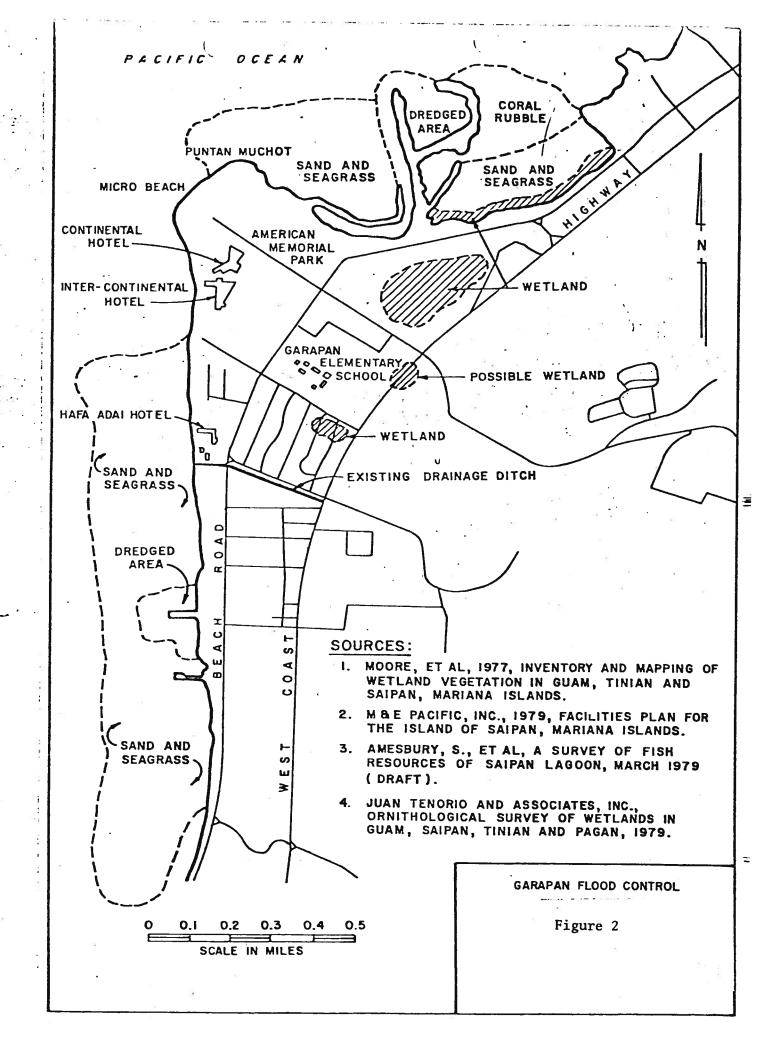
2, 7, 11, 15 MP - Memorial Park, includes Amesbury's habitat types 2, 9, 10.

FAMILY		_		BITA	collecting site <sup>2</sup>		
Species	2	7	9	10	11	15	GR GD MP
DASYATIDAE - Sting Rays				•			
Taeniura melanospila					+		
CHANIDAE - Milkfish							
Chanos chanos					+		
MURAENIDAE - Moray Eels							
Gymnothorax undulatus	+						
SYNODONTIDAE - Lizardfish							
Saurida gracilis			50		+	+	+ +
HOLOCENTRIDAE - Squirrelfish							
Adioryx diadema						+	
Flammeo opercularis						+	
F. sammara	+					+	+ +
M. murdjan	+		+			+	
APOGONIDAE - Cardinalfish							
Apogon coccineus							
A. novemfasciatus	+	+					+
A. nubilis	+						
Apogon sp. A		+		+			
Apogon spp.	+				+		
Cheilodipterus macrodon		_					
Paramia quinqurlineata	7	Ŧ				Τ	
SERRANIDAE - Groupers							
Epinephelus merra				+			**

:	FAMILY Species	2	7	НА 9	BITA 10	11	15	COLLEC GR	TING GD	SITE <sup>2</sup>
	POMACANTHIDAE - Angelfish Pomacanthus imperator					+		12		
	POMACENTRIDAE - Damselfish									
	Abudefduf septemfasciatus					1/2	+			
	A. sexfasciatus		+	+			+		+	
	Amphiprion clarkii				+		52			
	A. melanopus Chromis atripectoralis						+			
	C. caerulea		_	_	_		<b>T</b>			
	Xanthura sp.		T	+	T		T	Ť	+	
	Dascyllus aruanus		_	+		_	+	_	_	_
	D. reticulatus		•	. •	4	: *	8	th. T	т	Τ.
	D. trimaculatus	+			•	+				
	Eupomacentrus albifasciatus	+	+		•	•	+			
	E. fasciolatus	•	•				+ -			
	E. lividus						+			
	E. nigricans		+	+			+			
	Glyphidodontops leucopomus	+	+	•			•			
	Plectrogyphidodon leucozona	+	·		+					
	Pomacentrus pavo	+	+		+	+				
	P. vaiuli		+		+	+	+			
	Wild Provide Address of the Control									
	LABRIDAE - Wrasses									
	Cheilinus chlorurus	33	+		+					
	C. trilobatus	+	+		+		+			
	Cheilinus sp.	+								
	Cheilio inermis	+	+			+	+			
	Cirrhilabrus sp.				+					
	Cymolutes praetextatus					+				
	Epibulus insidiator						+	+		
	Comphosus varius				06		+			
	Halichoeres centriquadrus						+			
	H. hartzfeldi				+					
	H. margaritaceous		+							
	H. trimaculatus	+	+		+	+	+			
	H. melapterus		+				+			
	Labrichthys unilineatus						+	_		
	Labroides dimidiatus		+	+	+		+	+		
	Pseudocheilinus evanidus				+					
	Stethojulis bandanensis		+		+		+	+	+	
	S. strigiventer	+								
	Stethojulis juveniles Thalassoma hardwicke	+								
	T lutassoma nardwicke						+			
	T. lutescens				+		+	+		
	Xyrichtys macrolepidotus					+				
	X. taeniourus					Ť	+			

**	FAMILY	X1 W1 12 28		20	HA	BITA	T			CO	LLEC	TING	SITE <sup>2</sup>
91.0	Species		2	7	9	10	11	15		20	GR	GD	MP
-68 -47	Eusigobius Gnatholepis unidentifie	neophytus sp	4,9 %	6) 6)		+	+	+	3	:	8		et
RLRO	TRIDAE - Gob	×									•	•	•
	Asterropter	yx semipunctatus s microlepis s strigatus		+ ្រាំ	is .	+	+			*	ł	+	
вотн	IDAE - Left- Bothus manc	eyed Flounders us				•					+	+	
SOLE	IDAE - Soles Aseraggodes	melanostictus					+						
BALI	STIDAE - Tri Balistoides Rhinecanthu	viridesces		+		+	+ +	+			+	+	+
MONA	CANTHIDAE - ] Oxymonacant	Filefish hus <u>longirostris</u>						+			+	Đ,	
CANT	HIGASTERIDAE Canthigaste	- Sharp Nosed Puf r cornatus	fers								+	+	
TETR	ADONTIDAE - 1 Arothrn nig										+		
	TOTAL SPECI	ES	31	46	24	49	27	73			29	21	15

. ! . .



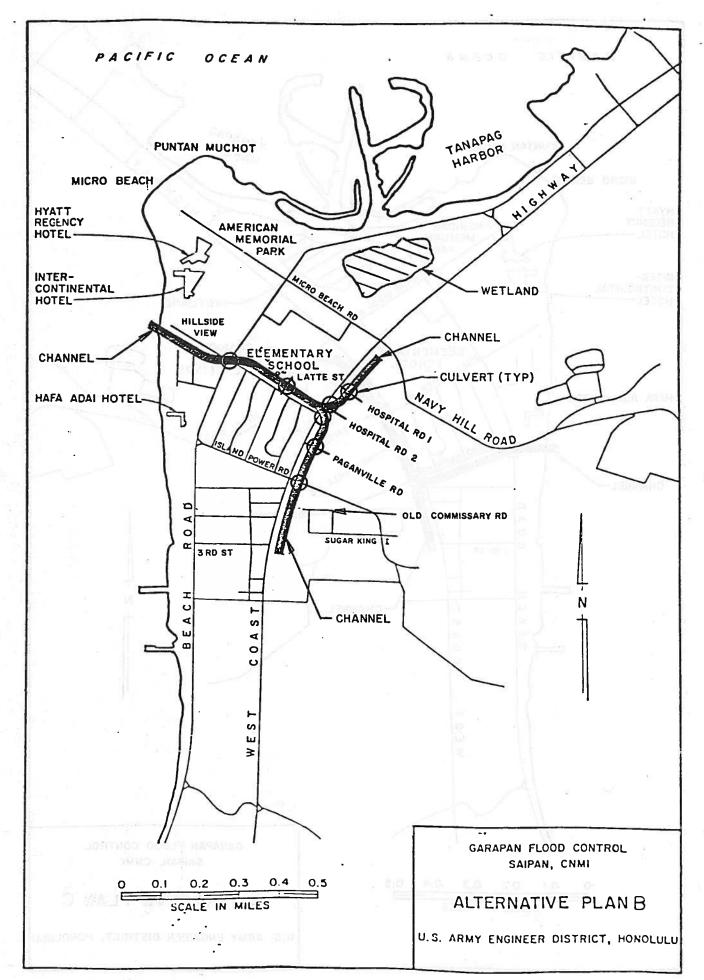


Figure 4

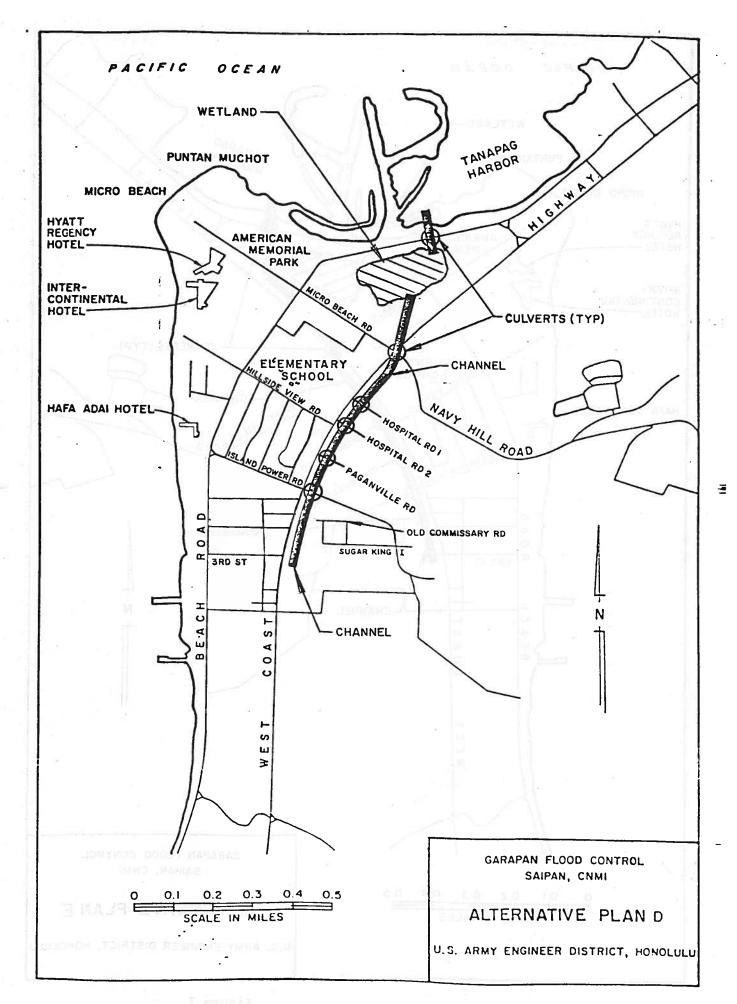
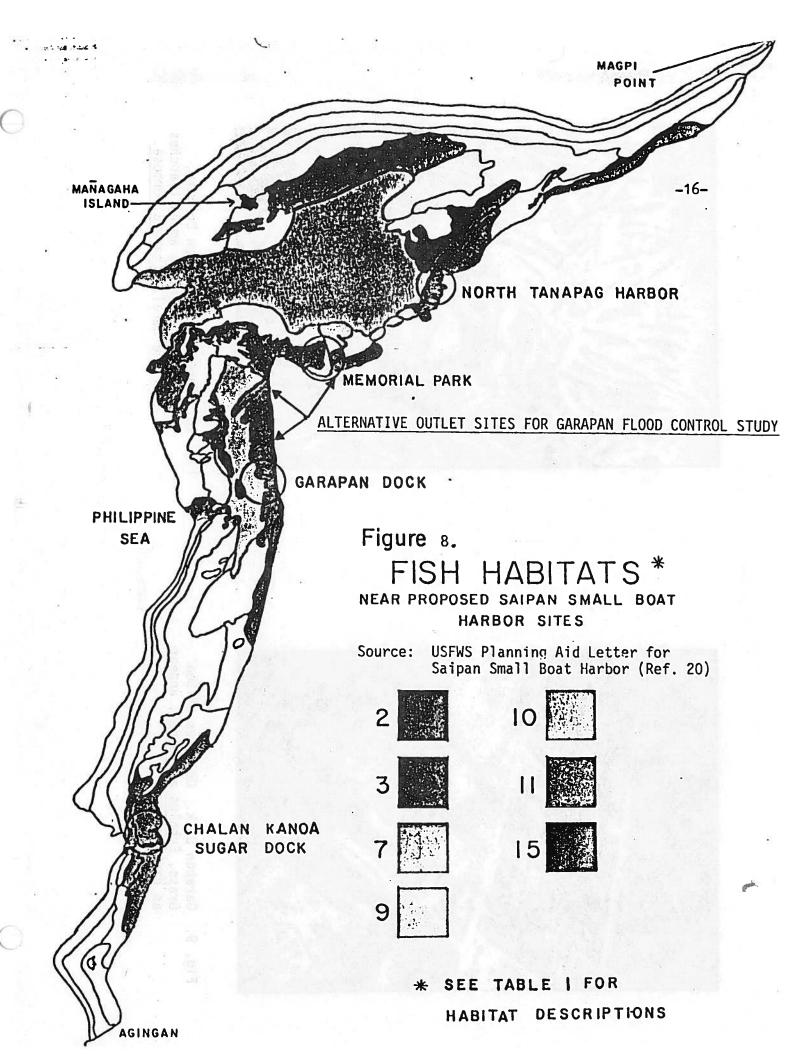


Figure 6



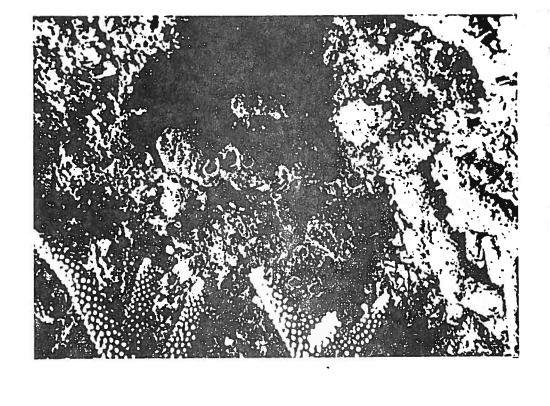


Fig. 12. Garapan Channel. Sponge in rubble-gravel adjacent to the reef.

Fig. 11. Garapan Channel. Sea cucumbers and feather duster worms.

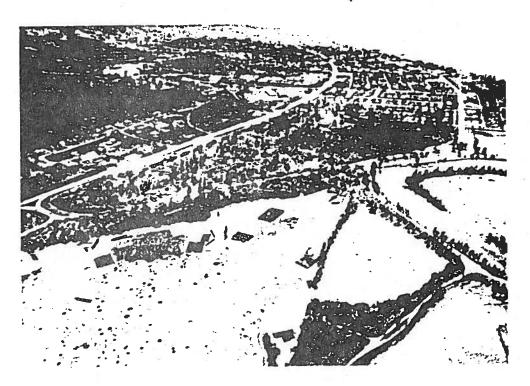


Figure 15. The American Memorial Park wetland. The blue lines illustrate the NEP Plan (solid line) and Alternative 5 (dotted line). The cleared area where a new hospital is being constructed would drain into the proposed channel.



Figure 16. The mudlfats and seagrass beds of Tanapag Harbor adjacent to the American Memorial Park provide the premier feeding and loafing site for migratory shorebirds on Saipan.

# BIOLOGICAL OPINION

U.S. FISH AND WILDLIFE SERVICE

for the

SAIPAN POWER CENTER, CHALAN LAULAU SAIPAN, COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS



٠;

December 14, 1994

# TABLE OF CONTENTS

FIGURES		1
INTRODUCTION		1
BIOLOGICAL OPI	NION NOIN	2
Description of	of the Proposed Action	2
Biology and A. B.	Population Status of the Species	3
Environment A. B.	Mariana Common Moorhen	5
Effects of the A. B.	e Action on Listed Species	6
Cumulative l	Effects	7
Biological O	pinion of the Service	7
INCIDENTAL TAK	Œ	7
Amount or E A. B.	Extent of Take	9
Effect of the A. B.	Take	10
Reasonable a	and Prudent Measures	10
Terms and C	Conditions	10
CONSERVATION	RECOMMENDATIONS	12
CONCLUSION		13
REFERENCES CIT	ED	14

# LIST OF FIGURES

Figure 1.	Project area of the Saipan Power Center on the Island of Saipan, Commonwealth of the Northern Mariana Islands (Source: SCS, 1993). (Not to scale)	16
Figure 2.	Project site of the Saipan Power Center on the Island of Saipan, Commonwealth of the Northern Mariana Islands (Source: J. C. Tenorio & Assoc., Inc. 1994). (Not to scale)	17
Figure 3.	Areas of wetland fill and wetland creation/enhancement for the Saipan Power Center, Commonwealth of the Northern Mariana Islands. (Not to scale)	18



# United States Department of the Interior

#### FISH AND WILDLIFE SERVICE

Pacific Islands Ecoregion 300 Ala Moana Blvd, Room 6307 P.O. Box 50167 Honolulu, Hawaii 96850

In Reply Refer To: MWR/DLB

DEC 1 4 1994

Lt. Colonel Bruce Elliott District Engineer U.S. Army Corps of Engineers Building 230 Fort Shafter, Hawaii 96858

Re:

Biological Opinion (Log Number 1-2-95-F-01), PODCO GNW-95-008, Saipan Power Center, Chalan Laulau, Saipan, Commonwealth of the Northern Mariana Islands (CNMI).

#### Dear Lieutenant Colonel Elliott:

This report represents the biological opinion of the U.S. Fish and Wildlife Service (Service) in accordance with section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544; Stat. 884), as amended, (Act) regarding potential impacts to the federally-listed, endangered Mariana common moorhen, Gallinula chloropus guami, and Nightingale reed-warbler, Acrocephalus luscinia, from the proposed issuance of Department of the Army (DOA) permit PODCO GNW-95-008. The Corps of Engineers (Corps) proposes to authorize J. C. Tenorio Enterprises, Inc. to fill 0.88 hectares (ha) [2.17 acres (ac)] of wetland in Chalan Laulau, Saipan, CNMI.

This biological opinion is based upon 1) review of the information presented in the permit application and proposed mitigation plan for the project, 2) information provided in the 1992 Recovery Plan for the Mariana Common Moorhen, 3) literature published on moorhens and reed-warblers, and 4) information gained during site visits to the project area.

The Corps requested initiation of section 7 consultation for the proposed permit action in a letter dated August 25, 1994, received by the Service on August 29, 1994. Service biologists conducted inspections of the project site and mitigation area on September 15 and November 2, 1994, with a biologist from the CNMI Division of Forestry and Wildlife (CNMI DFW). The log number for this consultation is 1-2-95-F-01. A complete administrative record of this consultation is on file in the Service's Pacific Islands Office (PIO) in Honolulu, Hawaii.

#### **BIOLOGICAL OPINION**

It is the biological opinion of the Service that issuance of DOA permit GIN94-021, as described below, is not likely to jeopardize the continued existence of the Mariana common moorhen or Nightingale reed-warbler. Some level of incidental take for these species is anticipated, and the Service has specified reasonable/prudent measures and terms/conditions to minimize the impact of any takings.

# Description of the Proposed Action

The Corps proposes to issue a Nationwide Permit, PODCO GNW-95-008, to authorize J. C. Tenorio Enterprises, Inc. (the applicant) to fill 0.88 ha (2.17 ac) of wetlands to facilitate the development of the Saipan Power Center in the Chalan Laulau District along the west central coast of Saipan (Figure 1). The purpose of the project is to provide retail, financial, and entertainment facilities for the people of Saipan. These facilities include two retail buildings totaling 8,379 square (sq) meters (m) [90,100 sq feet (ft)], a movie theater that is 1,860 sq m (20,000 sq ft), a financial building that is 558 sq m (6,000 sq ft), and a restaurant that is 1,116 sq m (12,000 sq ft).

The project site is located on private property and is generally bounded by Beach Road to the west, Chalan Pale Arnold to the east, and Chalan Monsignor Guerrero (Airport Road) to the southwest (Figure 2). The project site encompasses 7.18 ha (17.73 ac) that are zoned as autourban and includes 2.37 ha (5.84 ac) of wetlands and 4.81 ha (11.86 ac) of uplands. Project-site wetlands are dominated by karriso, *Phragmites karka*, and pago, *Hibiscus tiliaceus*. Upland habitat at the project site includes scrubby secondary forest dominated by tangantangan, *Leucaena leucocephela*, and limestone forest dominated by *Barringtonia asiatica* with *Ficus prolixa* and *Hernandia nymphaeifolia*.

The project includes a conceptual wetland mitigation plan to offset the loss of 0.88 ha (2.17 ac) of wetlands. The mitigation plan involves wetland creation from project-site uplands [0.88 ha (2.17 ac)] and enhancement of the remaining 1.49 ha (3.68 ac) of project-site wetlands. The resulting created/enhanced mitigation wetland will be 2.37 ha (5.84 ac) in size (Figure 3).

The mitigation wetland will have an irregular bottom contour and be excavated to a depth that will insure that the site retains open water areas during the dry season. It will also include an island or islands and a deep moat. The mitigation wetland will be planted with sedges along the littoral zone and submergents in the open water zone and will include a vegetated buffer of karriso. These features are included in the design of the mitigation wetland to provide year-round nesting and foraging habitat for Mariana common moorhens.

Additional features included in the conceptual mitigation plan to insure that the wetland is maintained primarily as moorhen habitat include (1) the removal of karriso if it covers more than 20% of the wetland, (2) the removal of encroaching woody vegetation, (3) the control of submergent vegetation, and (4) documenting and monitoring of vegetation growth and control.

#### Biology and Population Status of the Species

#### a. Mariana Common Moorhen

Unless otherwise referenced, the following information on the status and habitat requirements of the Mariana common moorhen is taken from the Recovery Plan for the Mariana Common Moorhen (USFWS, 1992), unpublished field notes, published literature, and field surveys.

The Mariana subspecies of the common moorhen is endemic to the Mariana Archipelago. Adults are about 35 cm (14 in) in length, have slate-black plumage, red bills and frontal shields, white undertail coverts, white bands on their flanks, and olive-green legs. Immature birds have brown plumage, small frontal shields, and brownish bills and legs. Chicks have black plumage and black legs (Ritter, 1994).

Mariana common moorhens inhabit natural and human-made seasonal and permanent fresh water and occasionally brackish water wetlands. Moorhens also make use of recently flooded pastures and newly created wetlands (Stinson, 1993; Ritter and Sweet, 1993). Moorhens are secretive and seem to prefer wetlands with equal areas of open water and vegetation. They are opportunistic feeders and feed primarily on plant and animal matter in or near the water, including algae, seeds, and aquatic insects and their larvae.

Reproductive and nesting characteristics of the Mariana common moorhen have been described (Ritter, 1994) and are similar to those of more temperate region moorhen subspecies (Howard 1940; Wood, 1974). Active Mariana common moorhen nests have been found in all months of the year [USFWS unpubl. data, CNMI DFW (Tinian) unpubl. data, CNMI DFW (Saipan) unpubl. data, Guam Department of Aquatic and Wildlife Resources (DAWR) unpubl. data]. Nests are typically constructed within emergent vegetation but also may be placed on beds of submergent vegetation or protruding stumps and logs. Artificial platforms such as floating boards may also be used as nest sites (USFWS unpubl. data; Guam DAWR unpubl. data; Ritter, 1994). Average clutch size for the Mariana common moorhen is approximately six eggs (Guam DAWR unpubl. data), and incubation requires 18-22 days (Brown, 1940; Wood, 1974; Byrd and Zeillemaker, 1981).

The Mariana common moorhen was listed as endangered on August 27, 1984 (49 FR 33885) (USFWS, 1994). Habitat loss was identified as the primary factor influencing the decline of this subspecies (USFWS, 1992). Other factors potentially affecting moorhen populations in the Mariana Islands include competition with tilapia (Stinson et al., 1991), nest loss due to flooding (Ritter, 1994; USFWS unpubl. data), destruction of nesting habitat by feral ungulates (Guam DAWR unpubl. data), hunting pressure, and predation by the brown tree snake and feral cats and dogs.

Present populations of Mariana common moorhens are found on Guam, Tinian, and Saipan. Archaeological excavations indicate the presence of the moorhen on Rota between 1,500-2,000 years ago (Butler, 1988). The population on Pagan is likely extinct due to volcanic activity

and feral ungulates (Stinson et al., 1991). No moorhens or wetlands exist on any of the other Mariana Islands.

Historically, moorhen populations on Guam were considered numerous and widely distributed. Moorhens were reported from fresh and brackish water wetlands, fallow rice paddies, and cultivated taro patches (Hartert, 1898; Seale, 1901; Baker, 1951; Beaty, 1967). Baker (1951) found large numbers of moorhens along the Ylig River and in the Agana Swamp. The most recent surveys (Ritter, 1989; Stinson et al., 1991) recorded moorhens at 18 wetlands on Guam, including 15 that are human-made.

Wetland habitats in the Northern Mariana Islands are not as diverse or abundant as those on Guam. Nevertheless, moorhen populations were considered abundant in high quality habitat such as Lake Hagoi on Tinian and Lake Susupe on Saipan (Stott, 1947; Marshall, 1949). The most recent surveys recorded moorhens at nine wetlands on Saipan (Stinson et al., 1991) and four wetlands on Tinian (USFWS unpubl. data).

The estimated total population of moorhens is 300-400 birds, including 100-125 birds on Guam, 100 birds on Saipan, and 75 birds on Tinian. An assessment of habitat loss and reviews of the literature and field notes indicate that the moorhen population in the Mariana Islands has been reduced by 36-52% in this century (Stinson et al., 1991).

#### b. Nightingale Reed-warbler

Unless otherwise referenced, the following information on the status and habitat requirements of the Nightingale reed-warbler is taken from unpublished field notes, published literature, and field surveys.

Three subspecies of the Nightingale reed-warbler are found in the Mariana Islands. A. l. luscinia is likely extinct on Guam but still found on Saipan and Alamagan (Reichel et al., 1992). The subspecies A. l. nijoi on Aguijan was thought to be extinct, but was recently rediscovered (Craig, 1992). The subspecies A. l. yamashinae known from Pagan is likely extinct (Reichel et al., 1992). Nightingale reed-warblers are not found on Rota or Tinian, but other subspecies are found in Micronesia on the islands of Chuuk, Pohnpei, and Nauru.

Reed-warblers are slender, long-billed, rather non-descript brownish/buff birds that inhabit dense vegetation around wetland/upland ecotones or other semi-open areas and second-growth forests. Reed-warblers feed on insects and their larvae, lizards, snails, and spiders (Seale, 1901; Marshall, 1949). Nightingale reed-warblers are territorial, and individual males are known to defend an area approximately 9000 sq m. Males have high site fidelity and appear to be monogamous while females may exhibit low mate fidelity between years. The breeding season is approximately January-June. (Craig, 1992).

The Nightingale reed-warbler was listed as an endangered species in 1970 (35 FR 8495 and 35 FR 18320) (USFWS, 1994). Loss of wetlands and understory vegetation by volcanic activity, land development, and feral ungulates; fires in wetlands; pesticides; and predation are cited as the primary reasons for these extinctions (Reichel et al., 1992).

Nightingale reed-warblers are still found on Alamagan where the conservative estimate of the population is 350 pairs (Reichel et al., 1992). The most recent surveys of reed-warblers on Saipan indicate that the birds are common over much of the island and are associated with karriso-dominated wetlands, native limestone forests, and habitats characterized by a dense understory, including wetland/upland ecotones and mixed tangantangan/grassland habitats (Craig, 1992; Reichel et al., 1992). Engbring et al. (1986) recorded 578 reed-warblers on Saipan during eight-minute counts. He estimated the average density of reed-warblers on Saipan to be 46 birds/sq km and the total population to be 4,867 birds.

#### Environmental Baseline

The environmental baseline describes the status of the species and factors affecting the environment of the species or critical habitat in the proposed action area contemporaneous with the consultation in process. The baseline includes State, local, and private actions that affect a species at the time the consultation begins. Unrelated federal actions that have already undergone formal or informal consultation are also a part of the environmental baseline. Federal actions within the action area that may benefit listed species or critical habitat are included in the environmental baseline.

#### a. Mariana Common Moorhen

Project-site wetlands are included in a complex of wetlands locally identified as the Chalan Laulau wetlands. The Chalan Laulau wetlands are generally dominated by dense stands of karriso and pago with limited open water areas. Nevertheless, smaller areas supporting an interspersion of open water and emergent and floating aquatic vegetation can be found along the outside edges of these karriso/pago-dominated wetlands. These small open areas represent suitable habitat for moorhens and are probably more frequently used by moorhens as sites for foraging and nesting than the dense karriso/pago dominated areas.

One such area, located outside the project boundary but contiguous to the project's mitigation area, was identified in the conceptual mitigation plan and visited by Service and CNMI DFW biologists on two occasions. During a September 15, 1994, visit, the area was dry, and no moorhens were observed using the wetland. However, on November 2, 1994, the site was flooded and approximately 0.3-0.6 m (1-2 ft) of surface water was present. One adult and three juvenile moorhens were observed during the November site visit. Based on these observations, it is likely that this area was used as nesting habitat during the 1994 rainy season.

To the best of our knowledge, no prior moorhen surveys have been conducted in wetland areas adjacent to or within the project site. Based on information gained during site visits and review of aerial photographs of the project-site wetlands, the Service estimates that less than one acre of wetland habitat is presently suitable for moorhen use within the project boundary. Since project-site wetlands are dominated by karriso and pago and have very limited open water areas, it is likely that these wetlands do not provide suitable nesting habitat for Mariana common moorhens. However, since moorhens have been observed within the contiguous wetland located just outside of the project boundary, they likely use project-site wetlands as escape cover and seasonally for foraging. Moorhens are more likely to use project-site wetlands during the rainy season when ponded areas are present and provide foraging habitat.

#### b. Nightingale Reed-warbler

Project-site habitats include both wetlands [2.37 ha (5.84 ac)] and uplands [4.81 ha (11.86 ac)]. Wetlands are dominated by karriso and pago. Uplands include a small area of *Barringtonia* forest but are predominantly scrubby secondary forest dominated by tangantangan. Transitional habitat comprised of both wetland and upland plant species occurs between the upland and wetland, habitats.

Project-site habitats are contiguous with adjacent offsite habitats from the north to the southeast. Offsite habitats include *Barringtonia* and scrubby secondary forest as well as karriso and pago. The remainder of the surrounding land is commercially developed.

The entire project site represents reed-warbler habitat. Information provided in the permit application states that one Nightingale reed-warbler was recorded at the project site in January 1994. The bird was observed in the vegetation margin between the wetlands and *Barringtonia* forest. During a site visit on November 2, 1994, Service biologists observed that the adjacent wetland and upland habitats also represent potential foraging and nesting habitat for reed-warblers.

Engbring et al. (1986) estimated the average density of Nightingale reed-warblers as 46 birds/sq kilometers (km) on Saipan. Using this data, we estimate that the project site currently supports approximately four Nightingale reed-warblers. This number represents approximately 0.08% of the estimated population of reed-warblers on Saipan.

# Effects of the Action on Listed Species

#### a. Mariana Common Moorhen

The primary concerns of the Service with regard to the effects of the permit action on Mariana common moorhens are (1) the loss of approximately 0.88 ha (2.17 ac) of wetland and (2) the potential for recurring destruction of moorhen nests and eggs and mortality of moorhen chicks during maintenance activities at the mitigation site.

Approximately 0.88 ha (2.17 ac) of existing karriso-dominated wetland will be filled to facilitate the development of the Saipan Power Center. These wetlands are likely used by moorhens as escape and foraging habitat, particularly during the rainy season when ponded areas are present. Habitat loss is a primary reason for the decline of the Mariana common moorhen. Incremental wetland losses represent permanently removed habitat, which, if otherwise protected and managed, could contribute to the recovery goals of the species. Therefore, even the loss of small areas of the Chalan Laulau wetlands represents an adverse effect to Mariana common moorhens.

Nevertheless, any moorhens using project-site wetlands at the time of construction would likely disperse to the adjacent wetland habitat. Therefore, no harm to moorhens is anticipated as a result of construction activities associated with the filling of project-site wetlands.

The development of the Saipan Power Center includes a conceptual mitigation plan to offset the loss of project-site wetlands. Enhancement of existing wetlands and creation of wetland from uplands will result in 2.36 ha (5.84 ac) of managed and permanent open water wetland habitat at the project site. The development of the mitigation wetland will occur concurrently with the filling activities. Based on the proposed characteristics of the mitigation wetland (open water, vegetation, management) and the size of the mitigation site, it is anticipated that the mitigation wetland will provide year-round nesting and foraging habitat for an estimated two breeding pairs of Mariana common moorhens.

Recurring harassment of moorhens and potential loss of nests/eggs/chicks is anticipated to occur during periodic maintenance activities at the mitigation site. Adult and juvenile moorhens present within the mitigation wetland when these activities are initiated will likely be harassed by increased noise from machinery and human activity. These disturbance factors may disrupt normal foraging and nesting behaviors and cause moorhens to temporarily disperse from or to avoid using the mitigation wetland. If the maintenance activities occur when moorhen are nesting, then the loss of nests/eggs and chicks would be anticipated, as well as loss of reproductive capability of displaced adults that are not able to immediately establish new breeding territories. Harm and harassment of moorhens is more likely to occur during the rainy season when available nesting and foraging habitat is increased.

## b. Nightingale Reed-warbler

The primary concerns of the Service with regard to the effects of the permit action on the Nightingale reed-warbler are (1) the loss of reed-warbler habitat and (2) the potential loss of nests with eggs and/or chicks during construction of the project and the mitigation wetland.

Approximately 7.18 ha (17.73 ac) of potential reed-warbler habitat will be destroyed to facilitate construction of the Saipan Power Center. This includes (a) the loss (filling) of 0.88 ha (2.17 ac) of karriso wetland, (b) the loss (clearing) of 3.92 ha (9.60 ac) of Barringtonia and scrubby secondary forest for development of the Power Center, and (c) the conversion of

1.49 ha (3.67 ac) of karriso wetland and 0.88 ha (2.17 ac) of scrubby secondary forest to emergent vegetation/open water habitat to develop the mitigation wetland.

Based on observations made during site visits to the project area, reed-warbler habitat is known to exist on adjacent lands. The Service believes that any adult and juvenile reed-warblers displaced by the project could successfully disperse to unoccupied habitat within these adjacent areas. Therefore, no harm to adult or juvenile reed-warblers is anticipated as a result of construction activities associated with the filling of the project-site wetlands, clearing of upland forests, or construction of the mitigation wetland.

Harm to reed-warblers is more likely to occur if filling, clearing, and conversion activities are conducted during the breeding season (January-June). Loss of nests/eggs and chicks would be anticipated, as well as potential loss of reproductive capability of displaced adults that are not able to immediately establish new breeding territories.

#### Cumulative Effects

Cumulative effects include the effects of future State, local, or private actions that are reasonably certain to occur in the area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. The Service has not identified any cumulative effects in the project area that may impact Mariana common moorhen or Nightingale reed-warblers.

## Biological Opinion of the Service

After reviewing the current status of the Mariana common moorhen and the Nightingale reedwarbler, the environmental baseline of the species in the action area, the effects of the proposed action, including cumulative effects, it is the Service's biological opinion that issuance of PODCO GIN94-021 to facilitate the development of the Saipan Power Center, as proposed, is not likely to jeopardize the continued existence of the Mariana common moorhen or the Nightingale reed-warbler. No critical habitat has been designated for these species; therefore, none will be affected.

#### INCIDENTAL TAKE

Sections 4(d) and 9 of the Act, as amended, prohibit the taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct) of a listed species of fish and wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in the death or injury to listed species by significantly impairing behavioral patterns, such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not

limited to, breeding, feeding, or sheltering. Under the terms of section 7(b)(4) and section 7(0)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement. The measures described below are non-discretionary and must be implemented by the Corps or become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(0)(2) to apply.

The Corps has a continuing duty to regulate the activity that is covered by this incidental take statement. If the Corps fails to adhere or require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(0)(2) may lapse. This exemption only applies to the Endangered Species Act, as amended, and does not supersede the requirements of the Migratory Bird Treaty Act.

#### Amount or Extent of Take

#### a. Mariana Common Moorhen

Incidental take in the form of harassment of adult and juvenile moorhens and potential harm to moorhen nests/eggs and chicks may occur during maintenance activities at the mitigation wetland. Based on the above information, the following levels of incidental take are anticipated:

- 1. Harassment of four adult moorhens and four juvenile moorhens during as-needed maintenance activities at the mitigation wetland.
- 2. Loss of three moorhen chicks and one moorhen nest per maintenance event at the mitigation wetland.

# b. Nightingale Reed-warbler

Incidental take in the form of harm to adult Nightingale reed warblers and their nests with eggs and/or chicks may occur as a result of loss and modification of upland and wetland habitats within the project area.

Based on the above information, the following levels of incidental take are anticipated:

- 1. Loss of 7.18 ha (17.73 ac) of foraging and potential nesting habitat for Nightingale reed-warblers.
- 2. Loss of one Nightingale reed-warbler nest with eggs/chicks as a result of forest and wetland habitat loss and modification within the Saipan Power Center development site.

#### Effect of the Take

#### a. Mariana Common Moorhen

The Service has determined that this level of impact is not likely to result in jeopardy to the Mariana common moorhen because (1) no harm to adult or juvenile moorhens is anticipated, (2) the mitigation wetland will provide year-round foraging and nesting habitat for moorhens and offset the loss of wetland habitat filled for project construction, and (3) the applicant has committed to provide periodic maintenance at the mitigation wetland, which will provide stable moorhen habitat and promote the recovery of this subspecies.

#### b. Nightingale Reed-warbler

The Service has determined that this level of impact is not likely to result in jeopardy to the Nightingale reed-warbler because (1) no harm to adult or juvenile reed-warblers is anticipated and (2) the potential loss of nests with eggs and/or chicks due to filling of wetland habitats and conversion of wetland and upland habitats represents a one time loss in reproduction for the birds in the project area.

#### Reasonable and Prudent Measures

The Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize take:

- 1. The Corps shall insure that the applicant fully complies with the special conditions of the permit.
- 2. The Corps shall require the applicant to minimize the destruction of moorhen and reed-warbler nests/eggs and mortality of moorhen and reed-warbler chicks during (1) filling of the existing wetland, (2) enhancement and creation of the mitigation wetland, and (3) maintenance activities at the mitigation wetland.
- 3. In order to preserve the remaining reed-warbler habitat at the project site, the Corps shall require the applicant to maintain the vegetation margin between the wetland and the development in its existing condition by not landscaping this area.

## Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, it is mandatory that the Corps comply with the following terms and conditions, which implement the reasonable and prudent measures described above:

- 1. The Corps shall require the applicant to have a qualified biologist conduct moorhen and reed-warbler censuses and nest searches within the project-site wetlands prior to filling and conversion activities. Results of the surveys shall be provided to the CNMI DFW and the PIO. Resource agencies will provide additional instructions for protecting any nests/eggs/chicks identified.
- 2. The Corps shall require the applicant to instruct contractors to avoid destroying active moorhen and reed-warbler nests with eggs. Contractors observing nests in any work area are to notify the Saipan DFW (670/233-9095) and the PIO (808/541-3441) for additional instructions for protecting nests/eggs/chicks.

The second secon

- 3. The Corps shall require the applicant to conduct the filling of wetlands for development of the Saipan Power Center during the middle to latter portion of the dry season, if possible.
- 4. The Corps shall require the applicant to conduct wetland enhancement and creation of the mitigation site during the middle to latter portion of the dry season, if possible.
- 5. The Corps shall require the applicant to schedule maintenance activities within the mitigation wetland during the middle to latter portion of the dry season.
- 6. The Corps shall require the applicant to have a qualified biologist conduct a moorhen census and nest search within the mitigation wetland prior to each maintenance event. Results of the surveys shall be provided to the CNMI DFW and the PIO. Resource agencies will provide additional instructions for protecting any nests/eggs/chicks identified.
- 7. The Corps shall require the applicant to instruct contractors working within the mitigation wetland to avoid destroying active moorhen nests/eggs or harming chicks. Contractors observing nests/eggs or chicks in any work area are to notify the CNMI DFW (670/233-9095) and the PIO (808/541-3441) for additional instructions for protecting nests/eggs/chicks.
- 8. The Corps shall inform the applicant that the mitigation plan is conceptually approved by the Service, but the applicant should, within budgetary confines, implement any additional measures recommended by the Service and CNMI DFW to modify or rectify the mitigation wetland for the benefit of endangered species in the area.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impacts of the incidental take that might otherwise result from the proposed action. With implementation of these measures, the Service believes that harassment of moorhens and reed-warblers will be minimized and no moorhens or reed-warblers will be

harmed during maintenance activities at the mitigation wetland. If, during the course of the action, the amount or extent of incidental take is exceeded, such incidental take would represent new information requiring review of the reasonable and prudent measures provided. The Corps must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modifications of the reasonable and prudent measures.

Disposition of Sick, Injured, or Dead Individuals

The Service's Law Enforcement office in Guam (671/472-7146) or the CNMI DFW (760/233-9095) should be notified immediately for care instructions regarding any sick or injured Mariana common moorhens or Nightingale reed-warblers found within the project area. If dead individuals are found, the Service's Law Enforcement Office in Guam or the CNMI DFW should be notified within one working day. Dead moorhens or reed-warblers should be wrapped in aluminum foil and refrigerated (dead birds should not be wrapped in plastic or placed in a freezer). The Service's Law Enforcement Office or the CNMI DFW will provide further instructions on the proper disposal of the animals, including shipping requirements to facilities to determine cause of death, if the cause is not known. The Service's Law Enforcement Office in Guam, the PIO in Honolulu, and the CNMI DFW should be provided with a written report describing the events surrounding the demise or injury of the species, if known.

# CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The recommendations provided here relate only to the proposed action and do not necessarily represent complete fulfillment of the Service's Section 7(a)(1) responsibilities for the species.

Suitable moorhen habitat is limited in the Mariana Islands and loss of habitat is cited as the primary reason contributing to the decline of this subspecies. Protection of existing wetlands and long-term management of vegetation to create more open water habitats would promote the recovery of moorhens. The Service recommends that the Corps encourage the applicant to consider the acquisition of the wetland immediately adjacent (southwest) to the mitigation site. This wetland currently provides excellent nesting and foraging habitat for moorhens. The Service is willing to provide technical assistance to J. C. Tenorio Enterprises, Inc. in designing a wetland enhancement plan and developing wetland management objectives for the benefit of the endangered Mariana common moorhen and other wetland-dependant species at this wetland. This action would represent the initial effort by a private wetland owner in the CNMI to acquire additional wetland area and manage it for the benefit of moorhens.

Incremental development of scrub/tangantangan upland represents loss of existing and potential Nightingale reed-warbler habitat. The Service is concerned that the loss of upland habitat for wetland creation that benefits moorhens may negatively impact reed-warblers. The Service recommends that in the future the Corps require applicants to conduct thorough reed-warbler surveys in upland habitats where mitigation actions are being considered.

In order for the Service to be kept informed of actions that either minimize or avoid adverse effects or that benefit listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

#### CONCLUSION

This concludes formal section 7 consultation on this action. As required by 50 CFR 402.16, reinitiation of formal consultation is required if (1) the amount or extent of incidental take is exceeded, (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion, (3) the agency action is subsequently modified in a manner that causes an adverse effect to the listed species or critical habitat that was not considered in this opinion, or (4) a new species is listed or critical habitat designated that may be affected by this action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have questions concerning any of the information contained in this biological opinion, please contact Fish and Wildlife Biologists Michael Ritter (808/541-3441) or Dianne Bowen (808/541-2749).

Sincerely,

**Enits** 

Brooks Harper Field Supervisor

**Ecological Services** 

cc: CNMI DFW, Saipan

J. C. Tenorio Enterprises, Inc.

Corps, Guam

Richard Hill, USFWS, Portland

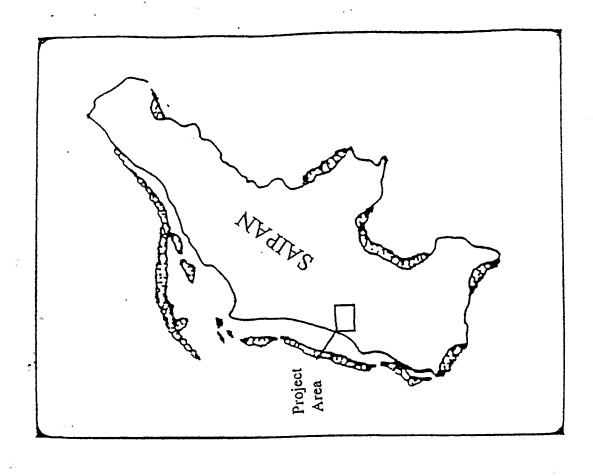
#### REFERENCES CITED

- Baker, R. H. 1951. The avifauna of Micronesia, its origin, evolution, and distribution. Univ. Kans. Publ. Mus. Nat. Hist. 3:1-159.
- Beaty, J. J. 1967. Guam's remarkable birds. South Pacific Bull. 4:37-40.
- Brown, R. H. 1940. Notes on a pair of moorhens. Brit. Birds 37:202-204.
- Butler, B. M. [ed.] 1988. Archaeological investigations on the north coast of Rota, Mariana Islands. Micronesian Archaeol. Surv. Rep. 23:1-482. [=S. Illinois Univ. at Carbondale, Center for Archaeol. Investigations Occ. Paper 8].
- Byrd, G. V., and C. F. Zeillemaker. 1981. Ecology of nesting Hawaiian Gallinules at Hanalei, Hawaii. West. Birds 12:105-116.
- Craig, R. 1992. Territoriality, habitat use and ecological distinctiveness of an endangered Pacific Island Reed-warbler. J. Field Ornithol. 63(4):436-444.
- Division of Aquatic and Wildlife Resources (DAWR). Unpubl. field notes. Dept. Agric., Government of Guam, Mangilao, Guam.
- Division of Fish and Wildlife (DFW). Unpubl. field notes. Dept. of Land and Nat. Res., Commonwealth of the Northern Mariana Islands, Saipan.
- Division of Fish and Wildlife (DFW). Unpubl. field notes. Dept. of Land and Nat. Res., Commonwealth of the Northern Mariana Islands, Tinian.
- Engbring, J., F. Ramsey, and V. Wildman. 1986. Micronesian Forest Bird Survey, 1982: Saipan, Tinian, Agiguan, and Rota. U.S. Fish and Wildlife Service. 143 pp.
- Hartert, E. 1898. On the birds of the Mariana Islands. Novit. Zool. 5:51-69.
- Howard, E. 1940. A Waterhen's Worlds. Cambridge University Press, Cambridge. 84 pp.
- Marshall, J. T., Jr. 1949. The endemic avifauna of Saipan, Tinian, Guam and Palau. Condor 51:200-221.
- Reichel, J., G. Wiles, and P. Glass. 1992. Island Extinctions: The case of the endangered Nightingale Reed-Warbler. Wilson Bull. 104(1):44-54.
- Ritter, M. W. 1989. Moorhen recovery and management. *In:* Div. Aquatic Wildl. Res. Ann. Rept., FY 1989:207-213. Dept. of Agric., Government of Guam, Mangilao, Guam.

# REFERENCES CITED CONT.

- Ritter, M. W. and T. M. Sweet. 1993. Rapid colonization of a human-made wetland by Mariana Common Moorhen on Guam. Wilson Bull. 105:685-687.
- Ritter, M. W. 1994. Notes on nesting and growth of Mariana common moorhens on Guam. Micronesica 27.
- Seale, A. 1901. Report of a mission to Guam. Occ. Papers Bernice P. Bishop Mus. 1:17-60.
- Soil Conservation Service. 1993. Draft Watershed Plan Environmental Impact Statement Kagman Watershed, Saipan, CNMI. U.S. Department of Agriculture. 137 pp.
- Stinson, D. M. 1993. Mariana Common Moorhen. In: Div. of Fish and Wildl. Prog. Rept., Oct. 1987-Sept 1992:283-297. Commonwealth of the Northern Marianas Islands, Saipan.
- Stinson, D. M., M. W. Ritter, and J. D. Reichel. 1991. The Mariana Common Moorhen: decline of an island endemic. Condor 93:38-43.
- Stott, K., Jr. 1947. Notes on Saipan birds. Auk 64:523-527.
- Tenorio, J. C., and Associates, Inc. 1994. Preliminary Wetlands Mitigation Plan for the Saipan Power Center. J. C. Tenorio & Associates, Inc. Saipan. 14 pp.
- U. S. Fish and Wildlife Service. 1992. Recovery Plan for the Mariana Common Moorhen (=Gallinule), Gallinula chloropus guami.
   U.S. Fish and Wildlife Service, Portland, OR. 55 pp.
- U.S. Fish and Wildlife Service. 1994. Endangered and Threatened Wildlife and Plants. 50 CFR 17.11 & 17.12. 42 pp.
- U.S. Fish and Wildlife Service. Unpublished field notes. Ecological Services, Pacific Islands Office, Honolulu.
- Wood, N.A. 1974. The breeding behavior and biology of the moorhen. British Birds 67:104-115, 137-158.





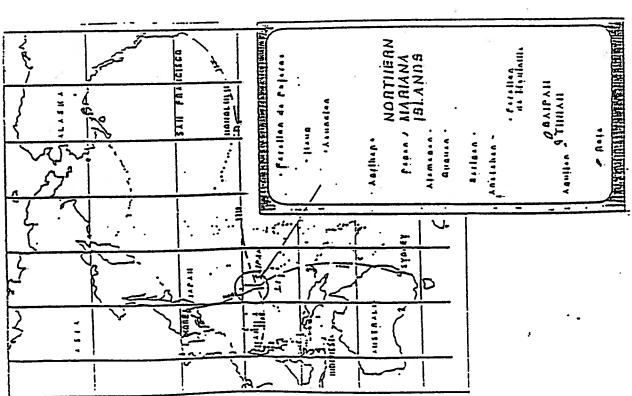


Figure 1. Project area of the Saipan Power Center on the Island of Saipan.

Commonwealth of the Northern Mariana Islands

(Source: SCS. 1993). (Not to scale)

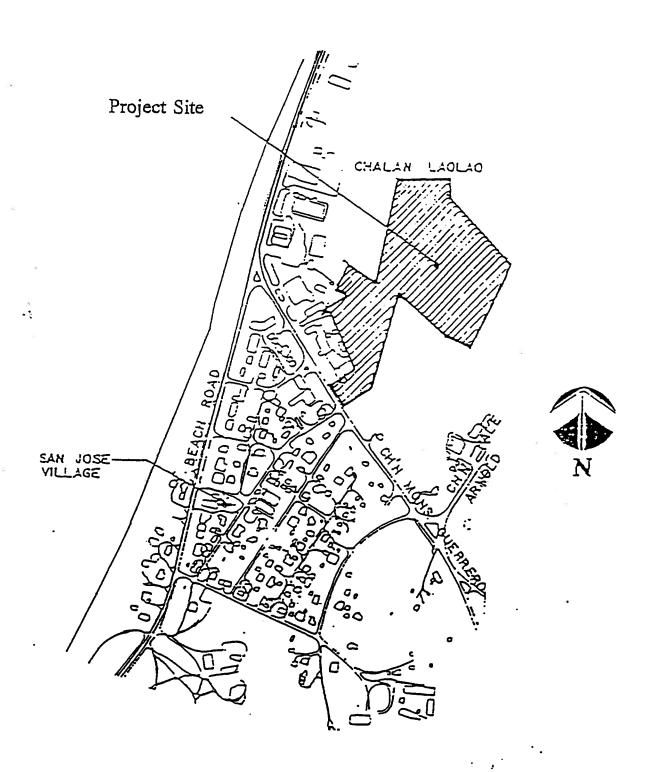


Figure 2. Project site of the Saipan Power Center on the Island of Saipan, Commonwealth of the Northern Mariana Islands (Source: J. C. Tenorio & Assoc., Inc., 1994). (Not to scale)

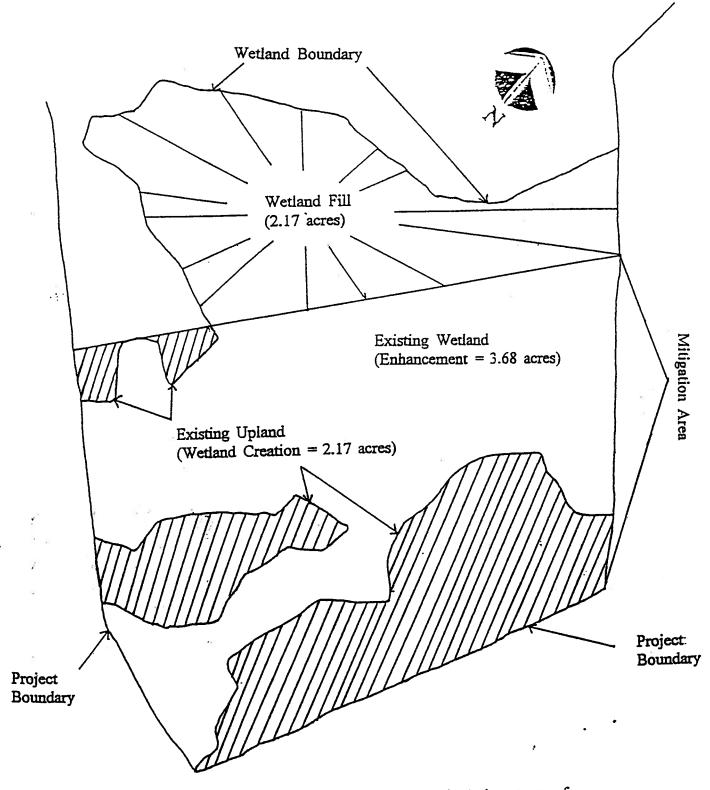


Figure 3. Areas of wetland fill and wetland creation/enhancement for the Saipan Power Center, Commonwealth of the Northern Mariana Islands. (Not to scale)

Appendix D
Agency Consultation Letters



Commonwealth of the Northern Mariana Islands Department of Lands and Natural Resources

## Division of Fish and Wildlife

P.O. Box 10007, Saipan, MP 96950 Telephone: (670) 664-6000/664-6001



FW-L-11-096

October 31, 2011

Environet, Inc 650 Iwilei Road, Suite 204 Honolulu, HI 96817

Subject: Request for listed species regarding the Saipan Lagoon Aquatic Ecosystem Restoration Plan

To Whom It May Concern:

Thank you for your request for listed species. The species of concern in the CNMI, and federally listed endangered species are as follows;

Nightingale Reed-Warbler (Acrocephalus luscinia) Mariana Common Moorhen (Gallinula chloropus guami) Micronesian Megapode (Megapodius laperouse) Mariana Fruit Bat (Pteropus mariannus) Mariana Swiftlet (Aerodramus bartschi), Rota Bridled White-eye (Zosterops rotensis) Mariana Crow (Corvus kubaryi)

Note, not all species are found on each island. DFW coordinates with the United State Fish and Wildlife Service (USFWS) on all matters concerning federally listed species. In all cases of development, surveys are necessary to ensure that there is no impact to these species of concern or to determine necessary mitigation measures.

Once specific areas for development are flagged and appropriate permit applications and survey requests completed, DFW will discuss surveys for a project area. If there are any questions please contact the wildlife division at 664-6012.

Sincerely,

Arnold I. Palacios DFW Director

cc:

CRM USFWS DEQ



#### DEPARTMENT OF THE ARMY

U.S. ARMY CORPS OF ENGINEERS, HONOLULU DISTRICT FORT SHAFTER, HAWAII 96858-5440

October 30, 2012

REPLY TO ATTENTION OF:

Environmental Programs Branch Programs and Project Management Division

Ms. Merti Kani Acting Director Division of Historic Preservation Department of Community and Cultural Affairs Commonwealth of the Northern Mariana Islands P.O. Box 500090 Saipan MP 96950

Dear Ms. Kani:

The U.S. Army Corps of Engineers, Honolulu District (USACE-POH), is proposing an undertaking to restore the Saipan Lagoon aquatic ecosystem as closely as possible to its natural state. The lagoon is located on the western shoreline of the island of Saipan, Commonwealth of the Northern Mariana Islands (CNMI). The project area extends from the Quartermaster Road north to just past the Fishing Base in Garapan and it includes the entire watershed that contributes ground and surface water runoffs to the approximately two-mile length of shoreline as well as to the adjacent offshore lagoon area out to the fringing coral reef (See enclosed Figures 1 through 3). Restoration alternatives are being formulated with the goal of restoring the ecosystem to be self-sustaining in the substantially modified environment. The purpose of this letter is to initiate Section 106 coordination and consultation with your office in compliance with the National Historic Preservation Act of 1966, as amended, and implementing regulations 36 CFR Part 800 (NHPA) for the proposed undertaking.

Three alternative drainage detention basin sites are being considered to achieve the overall project restoration goal. The proposed locations for the three retention basins are at the China House (Alternative 1), the Quartermaster Site (Alternative 2), and the Cock Fight Arena (Alternative 3) (See enclosed Figure 4). Three sizes of the basin are being designed for each of the three sites, corresponding to the expected influx of water during a two-year, five-year, and ten-year rainfall event; there are a total of nine possible scenarios for the three different site locations.

Background research of the project location identified archaeological remains that included features attributed to the Japanese and American World War II periods in the history of Saipan as well as subsurface prehistoric pottery-bearing cultural deposits. Garapan is also known for the presence of human burial remains, which were recorded during the development of shopping areas along Garapan's main thoroughfare. The Quartermaster Site location appeared to have

been extensively used as a warehouse area by the military during the World War II era while the Cock Fight Arena consisted of an abandoned modern-day quarry. A preliminary reconnaissance level walk-through survey of the three locations was conducted in 2003 by a two-person USACE-POH archaeological team who identified no surface archaeological sites; however, three concrete warehouse remnants were located in the Quartermaster Site area. All superficial structural remains of the warehouses had been completely destroyed and the warehouses themselves lacked any integrity and they were determined not eligible for nomination to the National Register of Historic Places.

The exact location and design of the three retention basins have yet to be determined. In any case, their locations shall be re-surveyed to ensure that no cultural resources are present anywhere near those areas. Because of the potential that subsurface cultural deposits, including human burial remains, may be present in the project areas, all construction activities shall be monitored by a qualified archaeologist in compliance with the Secretary of the Interior's Standards and Guidelines and who has at least two years of continuous archaeological experience working in the CNMI. Prior to the start of any ground breaking construction activities associated with this project, an Archaeological Monitoring Plan (AMP) shall be compiled by the archaeologist and submitted to your office for review and comments before its finalization. A full archaeological report documenting the results of the archaeological monitoring shall also be submitted at the end of all construction activities to your office for your library and files.

Based on our knowledge of the project area, we believe that the presence of a qualified archaeologist during construction will ensure the protection of potentially significant cultural resources including human burial remains that may be present subsurface within the project's area of potential effect. The USACE-POH, therefore, is of the opinion that, with the presence of a qualified archeologist monitor during all new ground breaking construction activities as well as the submittal of a final AMP and post-monitoring archaeological report to your office, a determination can be made that the proposed ecosystem restoration undertaking shall have adverse effect to historic properties.' In compliance with Section 106 of the NHPA, your concurrence to this determination is respectfully being sought.

Should your office have any questions, please contact Mr. Kanalei Shun, Archaeologist of my Environmental Program Branch, by telephone at (808) 835–4097 or e-mail kanalei.shun@usace.army.mil.

Sincerely,

Anthory J. Paresa, P.E.

Deputy District Engineer for

Programs and Project Management



# UNITED STATES DEPARTMENT OF COMMERCE National Oceanic and Atmospheric Administration NATIONAL MARINE FISHERIES SERVICE

Pacific Islands Regional Office 1601 Kapiolani Boulevard, Suite 1110 Honolulu, Hawaii 96814-0047

August 26, 2003

Milton Yoshimoto, Project Manager Department of the Army U.S. Army Engineer District, Honolulu Fort Shafter, HI 96858-5440

Re:

Saipan Lagoon Aquatic Ecosystem Restoration Project

Consultation No. I-PI-03-290

Mr. Yoshimoto:

This responds to your request for a current list of threatened and endangered species located in and around the area of the proposed Saipan Lagoon Aquatic Ecosystem Restoration project located on the island of Saipan, Commonwealth of the Northern Mariana Islands (CNMI). We provide the following comments and information under our statutory authorities under the Endangered Species Act of 1973, as amended, 16 U.S.C. 1531 et seq., and the Marine Mammal Protection Act of 1972, as amended 16 U.S.C. 1361 et seq. (MMPA).

Threatened green turtles (*Chelonia mydas*), endangered leatherback turtles (*Dermochelys coriacea*) and endangered hawksbill turtles (*Eretmochelys imbricata*) occur in the nearshore waters around Saipan. Endangered humpback whales (*Megaptera novaeangliae*) may be found offshore during the winter season. Other endangered marine mammals that have been sighted in the waters off Saipan include the sei whale (*Balaenoptera borealis*) and sperm whale (*Physeter macrocephalus*).

Marine mammals protected under the MMPA (not endangered or threatened under the ESA) that are found in the waters off Saipan include:

Bryde's whale (Balaenoptera edeni)
Cuvier's beaked whale (Ziphius cavirostris)
Pygmy sperm whale (Kogia breviceps)
Melon-headed whale (Peponocephala electra)
Pygmy killer whale (Feresa attenuata)
False killer whale (Pseudorca crassidens)
Killer whale (Orcinus orca)
Short finned pilot whale (Globicephala macrorhynchus)
Spinner dolphins (Stenella longirostris)
Striped dolphin (Stenella coeruleoalba)
Pantropical spotted dolphin (Stenella attenuata)
Common dolphin (Delphinus delphis)
Risso's dolphin (Grampus griseus)



Critical habitat has not been designated or proposed for any listed species under the jurisdiction of National Marine Fisheries Service (NOAA Fisheries) in Saipan. Also, at this time there are no candidate species in the Saipan area.

Information regarding proposed mitigation measures incorporated into the project will be important in determining whether formal or informal consultation is required for this project. Once our office receives more information regarding the proposed action and an assessment of impact of the proposed action on the applicable species, we can initiate section 7 consultation with your agency.

We appreciate your conscientious efforts to comply with Federal requirements. Should you have further questions regarding our comments for the proposed project and/or the section 7 process, please contact Margaret Akamine or David Nichols at (808) 973-2937.

Sincerely,

of Margaret Akamine

Protected Species Program



## Commonwealth of the Northern Mariana Islands Department of Community & Cultural Affairs

Office of the Secretary Saipan, Mariana Islands 96950



Reply to DIV. OF HISTORIC PRESERVATION

TEL: 564-2120 / 5 FAX: 664-2139

E-mail: crimihpo@itecnmi.com

Serial: 20145 File: Sect. 106

18 February 2003

Kanalei Shun CEPOD-ET-ES U.S. Army Corp of Engineers Pacific Ocean Division Building 230 Fort Shafter, Hawaii 96858-5440

Dear Dr. Shun,

This letter is to document the meeting of 5 February 2003 between yourself and Lon Bulgrin, the CNMI Staff Archaeologist, regarding the proposed Saipan Lagoon Remediation Project. Three separate locations were discussed that would be impacted by the project, the Quartermaster Road area, the China House/ I' Liyang area, and the Cock Fighting Ring area.

The Quartermaster Road area was extensively modified by the American military during World War II. A 1951 map depicting immediate post-war conditions on Saipan shows multiple large warehouse building in the area of the proposed earthmoving. It is very likely that concrete foundation pads and other structural elements remain from this logistical complex. Location and documentation of these historical resources will need to occur previous to mechanical clearing or excavation within this area. There is a procedure for requesting demolition of historical structures and structural remnants within the Commonwealth. Measured plan and profile drawings, 5 inch by 7 inch photographs taken from a minimum of two different directions, and a letter of justification are all required in a formal request for the demolition of historical structures. The Historic Preservation Officer then makes a decision whether to concur with the request for demolition or to enter into further negotiations with the client to mitigate the undertaking.

The World War II grading and construction activities make it unlikely that surface or shallow archaeological deposits remain intact. However, deeper cultural deposits may still survive. Therefore, monitoring by a qualified archaeologist of earthmoving to a depth of 120 centimeters (4 feet) below surface will be required. Two archaeological technicians from the CNMI HPO will be available to assist in the monitoring.

The Liyang Site, an Ancient Chamorro archaeological site dating to the Latte Period is located within the China House/I' Liyang area. In addition, an historic cemetery dating from the late 1920s into the 1950s is located in proximity to the project. My experience

with the earlier cemetery in South Garapan is that non-Christian Carolinian burials may extend in a fairly wide radius outside of the cemetery bounds.

A systematic subsurface survey will need to be conducted in order to determine the vertical and horizontal boundaries of the Liyang Site within the project area. I recommend a 10-15 meter interval for the test unit locations but this could vary depending on the archaeological research design. Backhoe test units will need to be excavated to a depth of 1.5 meters or 30 centimeters below the level that water is encountered. The archaeological site, as defined by the subsurface survey, should be avoided (with a suitable buffer zone) during excavation within the area. If excavation within the archaeological site is unavoidable a data recovery plan will need to be composed and implemented by a qualified archaeologist. Two CNMI HPO staff members will be made available to assist the ACOE archaeologist or contractor in this survey.

The proximity of the Liyang Site and the historic Liyang Cemetery indicates a high probability that Ancient Chamorro archaeological deposits and historical burials are located within portions of this project area. However, not all of this extensive land parcel has the same likelihood of cultural remains being present. Therefore, the project area could be stratified based on assigned probability for the presence of historical and archaeological remains. Archaeological monitoring for all earthmoving activities will need to be conducted in areas of high probability. Archaeological monitoring to a depth of 120 centimeters (4 feet) can be conducted for the lower probability areas. Two archaeological technicians from the CNMI HPO staff will assist in the archaeological monitoring.

Human remains discovered in the course of earthmoving will need to be treated in accordance with the Procedures for the Treatment of Human Remains in the Commonwealth of the Northern Mariana Islands. The CNMI HPO will facilitate the excavation and treatment of any human remains discovered.

The Cock Fighting Ring area is a low probability area for historical or archaeological resources. A surface survey to identify any resources within the land parcel should suffice to investigate this portion of the project area, assuming that no significant sites are discovered. Again, two staff members of the CNMI HPO will be available to assist this survey.

Thank you for consulting with our office well in advance of this important project. Early consultation allows problems to be addressed well in advance of the construction phase and serves to limit costly delays. Our office is pleased to assist the Army Corp of Engineers in this project through our trained archaeological staff. If we can be of further assistance or if you have further comments or questions in regards to this project please feel free to contact either myself or Lon Bulgrin.

Sincerely,

Epiphanio E. Cabrera Jr. Historic Preservation Office

c.c. Secretary DCCA



# Commonwealth of the Northern Mariana Islands Coastal Resources Management

P.O. Box 10007, 2nd Floor, Morgen Building San Jose Saipan, MP 96950



Tels.: (670) 8300/14 Fax: (670) 664-8315

November 19, 2003

Milton T. Yoshimoto Project Engineer U.S. Army Corps of Engineers Honolulu District Bldg. 230, Fort Shafter, Hi 96858-5440

Dear Mr. Yoshimoto:

CRMO is providing the additional information you requested in your project update of October 2003 and received by CRMO on November 3, 2003. The items of concern or information needing clarification prior to the completion of the conceptual design of the project restoration alternatives are as follows:

- 1. CRMO conducted a wetland site assessment in both the Quartermaster and the China House sites as specified in the US Department of Defense Figure (Saipan FUD Sites and CRM Areas of Particular Concern, 1999). On November 10, 2003, a wetland investigation was conducted in the Quartermaster and the China House sites. CRMO finds no evidence of wetland in these areas.
- 2. The tradewinds come from the north to northeast. Generally, the air quality around the Quartermaster and the China House sites is good. There are periods of degradation due to traffic in the form of dust and vehicular emissions. Air pollution can be mitigated by the retention of frontage vegetation and by developing dust control measures onsite during construction of the storm water infiltration/retention system.
- 3. The proposed project noise impact can be considered insignificant based on other EIA studies conducted for CRMO major siting permit in adjacent areas. It is understandable that heavy equipment creates noise. However, this work can be restricted to daylight hours and therefore, noise would not be a real concern.

- 4. Traffic congestion will most likely not be a problem. The proposed project should be able to develop its traffic control system to mitigate and avoid traffic congestion during peak hours.
- 5. The CRMO Marine Monitoring Team (MMT) has submitted its detailed biological lagoon analysis on seagrass transect studies. On November 17, 2003, Mr. Peter Houk send an email to Dr. Spengler, Environet, to contact him should he needs further information on the MMT lagoon studies.
- 6. The attached Saipan aerial photo shows land values.

Should you need additional information, please let us know.

Sincerely,

Director

Attachment

	<b>技术</b> 对 第		i Mariada Trakasa	411	17017 1401			The state of	17-15-10-10-11-11-11-11-11-11-11-11-11-11-11-
# # W	and Value	22,857 1,128 1,68,908 392,484 14,892 4,926 4,926 781,65,633	289,581 8,697 291,750 590,028	759,468 96,234 238,038 62,526 612,846 1,789,112	189 684 664,113 286,035 237,939 443,673 687,078 3,345 289,038	1511			
ti u y	% of Lot Needed La	XXXXXXX	2 2 2	36% 11% 59% 13%	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	<u>z</u>			
		1 100-1-04	269 2035 9035 Subtotal	23519 2980 7371 1936 18978	5874 20566 5 8858 3 7366 11370 6 21277 8 8851	284			
	Portion of Lot Needed for Proposed Wetland (Sq. meters)	Fringe/Easement Lot 7619 Fisher Lot 7619 576 576 55300 15028 15028 1502 1642 1642 51971	Fringe/Exsement Lot 8989 895.71 8989 289 289 289 7250 8035 Fringe/Exsement Lot Gusto Rai Subfoctal	China Hou		Quartermaster Su			X
	Portion of Lot Needed for Proposed Wetland (Sq. R.)	Fringe/Ease Fringe/Ease 7618 376 58303 130828 4964 1842 51921	Fringe/Eax 98527 2889 97250 Fringe/Eax	25.31.56 2351.9 2.2078 2.390 3.2078 2.390 7.3946 7371 2.094.2 1936 Could not find let 204.282 1936 204.282 1936	63228 221371 85345 78313 147891 229026 1115 96346	2837			
8	Port Sq. Propos	4569 1 1608 1 1608 1 1500 1 15007 1 15007 1 15007 1 15007	9305 8968 12697 15522 21606	65892 27618 12395 15184 Could n	11830 27380 27380 34463 15380 15380 12714				
£ 3	Lot Total Lot (Sq. Area (Sq. meters)			$\Pi\Pi\Pi\Pi$			į		
	Total Lot Area (Sq. ft.)	202 202 203 161 161 78	100154 96527 136874 167080 233210	710331 297278 133419 163435 219927	127333 224468 284715 370861 322624 19865 19865	$H \rightarrow HH$	itos. s and value	) 	· · · · · · · · · · · · · · · · · · ·
		5 Kg 22			GUAR TERMAS TER Ilbus, Francisca (reier of Rep. by Padricia Lanlyo Sarong, Febix (Heire of Rep. by Padricia Kalpat Langato, Maria (reier of Rep. by Donica Lines Langato, Maria (reier of) Rabadiman, Gregorio (reier of) Rep. by Dolores Rabaulina; Rapugato, Fablera (Heire of) Rep. by Dionicia Lines Rapugato, Fablera (Heire of) Rep. by Dionicia Lines Farses, Jacinto G.	T.D. 357 Somoravag, Fencisca FISHING DOCK (It is understood that this property is already being leased out	Notes: These calculations are based on uping the total areas of the proposed wetland sites.  All area and value calculations are approximate and may vary from actual lot sizes and values  Land value is based on an estimate of \$3 per square foot of land.	1	13
egotopia operania	DOWNER	PACIFIC MEDICAL SITE [FullAra, Cammn S. Torre, Guillemo Torre, Isabel - Torre, Guillemo Torre, Isabel - Torre, Guillemo Torrer, Sabel - Torre, Guillemo Tenoiro, Blar P. Cabrera, Sebelad (pibera, Jacoba Meirr of) Rep. by Felipe Seman (pibera, Jacoba Heirr of) Rep. by Felipe Seman (pibera, Jacoba Heirr of) Rep. by Maria R. Cruz Cruz, Vincente (Heirr of) Rep. by Maria R. Cruz	6		GUARTERMASTER  (Blub, Frenciera (Helire of) Rep. by Patrice Lanly Sarona, Fall (Heire of) Rep. by Patrice Lanly Sarona, Fall (Heire of) Rep. by Donica Limes Langare, Maria (Heire of) Rep. by Donica Limes Langare, Maria (Heire of) Rep. by Donica Limes Rabadima, Gregorio (Heire of) Rep. by Dolores Rapagae, Fallona (Heire of) Rep. by Dionica Lime Rapagae, Fallona (Heire of) Rep. by Dionica Lime Falseo, Jacinto Gr	adressly be	the propose vary from ac of land.		
	NAME OF LANDOWNER	SITE, Guillermo F, Guillermo F, Guillermo F, Of Rep. by	GUALO RAI SITE Deleon Guerrere, Mariano (Heiro of) Torres, Jese Pangelinan, Francisco S. Torres, Jose D. Wabol, Ignacio (Heiro of)	CHINA MOUSE Mangarro, Ria - Mangarro, Ana Panguilhan, Joaquis S. Ogumoro, Nicolas - Ogumoro, Luis Faisano, Juan Diaz, Antonio Antola Pangelinan, Josepus S.	ER T Rep. by Fl Of Rep. by Fl Of Rep. by I Of Rep. by I I Heirs of Rep.	s property is	tel areas of the pro te and may vary fro square foot of fand.	19	
99 P	*	C MEDICAL SITE amen S. amen S. bel - Torres, Guil its P. torres, Guil its P. torbed delrs of R. coba (Heirs of R. its P. coba (Heirs of R. its P. coba (Heirs of R. its P. ente (Heirs of) R. ente (Heirs of) R.	Se D. Francisco	ina HOUSI Rita - Man n. Josquis S Moolas - O an nio Arriola	R TERMAS I nelsca (Heirs of laria (Heirs of laria (Heirs of mi, Gregorio Fabiana (He	Francisca	sed on using the follons are approximal one settmate of \$3 per 1	309,4	
		PACIFI Fullhia, C Torres, iss Torres, iss Torres, iss Cabura, 3 (gibara, 3s (gibara, 3s (gibara, 3s (gibara, 3s (gibara, 3s	GUALO RAI SITE Gleon Guerren, Mariano Torres, Mariano Pangelinan, Francisco S. Torres, Jose D. Wabol, Ignacio (Heirs of)	Ch Pangarero Pangelina Ogumoro, Faisao, Ju Diaz, Anto	CUA Sarong, Fra Angairo, M Lairapi, M Rabaulima Rapugao, Mettao, Be	Somorang is understo	based on ulations are	artermaster Site tal Land Value \$2,809,416	
	T.D./A.H.	TD. 490 TD. 540	T.D. 556 T.D. 632 T.D. 407	TD. 404 TD. 382 TD. 401 TD. 664	T.D. 417 T.D. 376 T.D. 376 T.D. 375 T.D. 395 A.H. 142 A.H. 443	TD. 397	These calculations are ha All area and value calculat Land value is based on an	iartermaster Site ital:Land Value \$.	
	LOT/TRACT NO.		i Let	ot 1925		SE	These calc All area an Land value	rmas and	
to the second	LOTA		EA 755 EA 711 c EA 111 c 1890 Lot 1893	Lot 1856 Lot 1833 Part of Le	Lot No. 1832 Lot No. 1832 Lot No. 1822 Lot No. 1828 Lot No. 1830 Tract No. 218	7 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Notes	uarte otal L	
	9,112	m la la	925	e 10:71				ō≓" V	
	1.76	6.234	$\Sigma$	6.79	,		V No.	965 89,037 7,075	1 [5]
200	Site Ilue:	28.	\$612,843 11833 18,037	* ** au		1 1 1	1	10 2 3 5 2 5 1 5 1 5 1 5 1 5 1 5 1 5 1 5 1 5 1	
	na House S al Land Val		\$56					1826 1826	Lot 11822
	ia Ho Il Lar	356 465	ne Spenja		, b, <sup>1</sup>		Lot 1931 \$664,110		1,1825 86.034
	Chin Tota	Lot 18 \$759.				i i	CONTRACTOR LABOUR	22	if /.
o <sup>t</sup> la						17	Lot 1930 \$687 075	Lot	[T]
		4.00				Ţ	Lo	3) : 0	$\prod_{i=1}^{n}$
Singer							W .		J
							インドルル 有よどとも		Contract of the Contract of th
-									
									2000

Appendix E
Documented Meetings on Saipan

#### May 18, 2002

## Subject: Summary of Work Tasks Completed during Environet's May 2002 Trip to Saipan

Steve Spengler and Matt Neal of Environet arrived on Saipan on Monday, May 6<sup>th</sup>. Dr. Spengler stayed in Saipan until Wednesday May 15<sup>th</sup> while Mr. Neal stayed on the island until May 12<sup>th</sup>. Dr. Spengler spent a day on Guam on May 15<sup>th</sup>, returning to Honolulu on May 16<sup>th</sup>.

The table below lists the people who were contacted during this visit to discuss various aspects of the Saipan Aquatic Ecosystem Restoration project.

NAME		AGENCY AND TITLE	PHONE	NOTES
Jack	Salas	CRM, Chief Enforcement	670-234 6623	Co-Sponser
Doug	Mauro	CRM	670-234-6623	GIS / CAD
Brian	Bearden	DEQ	670-664 8510	
Clarrissa	Tanaka	DEQ, Chemist	670-664 8500	Water Quality Data
Peter	Houk	DEQ, Marine Fishery	670-664 8504	Aquatic Biologist
Vince	Castro	DLNR	670-234-3751	GIS Atlas / Dept of Public Lands
Robert	Carruth	USGS	670-322 2060	Rainfall Data
John	Starmer	CRM	670-234-6623	Aquatic Biologist
Thorne	Abbott	U.S. Fish and Wildlife Service	670-664-6025	Wetlands Specialist
Kate	Moots	Dept of Fish and Wildlife	670-664-6019	Fisheries Biologist III
Michael	Trianni	Dept of Fish and Wildlife	670-664-6018	Sea Cucumbers / survey info
Steve	Spengler	Environet	808-833-2225	Environet Project Manager
Matthew	Neal	Environet	808-833-2225	Environet Task Manager
Joe	Kaipat	Safe Drinking Water Branch Manager	670-664-8509	DEQ: Manager Safe Drinking Water
Robert	York	Northern Mariana Islands Museum	670-664-2160	Curator
Gigi	York	Northern Mariana Islands Museum	670-664-2160	Collection Curator
Lon	Bulgrin	Division of Historic Preservation	670-664-2122	Consulting Archaeologist
Becky	Lazama	CRM-Wetlands Material		Geotechnical Company: Perc Test
Scott	Russell	Council of the Humanities		Archaeology Expert and Author
Jun	Beltran	Geotesting	670-235-6000	
lke	Cabrera	Former DEQ head	670-483-8426	
Pete	Baubata	Head of CUC Laboratory		
Harold	Wood	Laboratory Manager for WERI	671-735-2688	303 University Dr. UOG Station
				Mangilao, Guam 96923

Division of Fish & Wildlife, PMB 2761, P.O. Box 10002, Saipan MP 96950
Division of Environmental Quality, P.O. Box 501304, Saipan MP 96950
Northern Mariana Islands Museum, P.O. Box 504570, Saipan MP 96950
Division of Historic Preservation, SPS #741, Box 10006, Saipan, MP 96950

The major tasks completed during this site visit are summarized below:

- 3/4 Downloaded pressure transducer and rainfall data from monitoring locations at the Hariguchi and Pizza Hut Buildings as well as from beneath the intersection of Quartermaster and Middle roads.
- 3/4 Reviewed aerial and other photograph database available at the University of Northern Marianas Pacific Collection laboratory.
- 3/4 Retrieved AutoCAD images for the shoreline delta areas from Meridian Surveying.
- 3/4 Reviewed As-Build Drawings from the Phase 4 road improvements along Middle Road that were completed in 1992.
- 3/4 Discussed potential restoration alternatives with three employees of the Fish and Wildlife Service and the Department of Fisheries.
- <sup>3</sup>/<sub>4</sub> Installed a pressure transducer in the drainage culvert beneath Middle road across the street from the Subway Sandwich shop.
- <sup>3</sup>/<sub>4</sub> Talked with Jun Beltran of Geotesting about compiling percolation data for the project watershed.
- <sup>3</sup>/<sub>4</sub> Installed a third automated rain guage on top of the Geotesting Building.
- <sup>3</sup>/<sub>4</sub> Collected stormwater samples from Drains Number 6, 11 and 13 between 6 to 6:30 AM. Submitted samples to DEQ laboratory (left with Marvin) for nutrient and microbial analysis at about 8:30 AM.
- <sup>3</sup>/<sub>4</sub> Did a quick reconnaissance tour of four potential future wetlands/retention basin sites present within the project watershed: Fishing Dock area, Drain 7 Area (located south of Wendy's), Quartermaster Road Area, and Gualo Rai wetland area. A fifth potential site exists just to the south of the new emergency medical facility located along Middle road.
- <sup>3</sup>/<sub>4</sub> Collected 21 groundwater samples from along the shoreline at low tide between 13:40 and 15:57. Primary sample locations were located at 0.2-mile intervals in moving south from the Fishing Dock. Secondary locations were located at 0.1-mile and 262-foot intervals in the vicinity of the Drain 7 wetland and the Drain 6 site. Analyzed samples in the field for temperature, conductance and pH. The following nine shallow, near-shore groundwater samples were submitted to DEQ for nitrate analysis: GWI-24, GWI-26, GWI-14, GWI-28, GWI-29, GWI-17, GWI-19, GWI-21 and GWI-23.

## Summary of Work Tasks Completed during Environet's June 2002 Trip to Saipan

Steve Spengler and Anson Murayama of Environet arrived on Saipan on Tuesday, June 25<sup>th</sup>. Dr. Spengler stayed in Saipan until Tuesday July 2nd while Mr. Murayama stayed on the island until June 29<sup>th</sup>. Milton Yoshimoto, Carl Larson and Ronald Pang of the USACE also traveled to Saipan on the same flight to attend project related meetings. A chronological summary of work completed during the visit is given below:

#### Wednesday, June 26th

Environet and Corp personnel met with four people (Henry Hofschneider, Mike Sablan, Jude Dickson and Frank Eliptico) from the Office of Public Lands, Northern Mariana Islands during a meeting which began at 9 AM. The main topic of the conversation, which lasted approximately one hour and a half, was to ascertain whether the office of public lands considers acquisition of land for construction of retention basins to be feasible. According to Deputy Director Hofschneider, acquisition of land will be possible but difficult. Mike Sablan agreed to contact various politicians to see if they would be willing to attend the meeting to be held at the CRM office tomorrow at 10:00. Mike will also work with Jesus Takai, the Director of the Division of Lands Registration and Survey, to determine the ownership of the parcels present within the proposed wetland and retention basin locations.

Environet personnel took Corp personnel to the five proposed retention structures to allow them to view each site

Provided Clarissa Tanaka with a list of the dates of stormwater and groundwater samples that were previously submitted to the DEQ laboratory for analysis.

#### Thursday, June 27th

Gave a Powerpoint presentation at the CRM conference room at 10:00 AM. A total of 14 people attended the meeting (Ronald Pang, Carl Larson, Anson Murayama, Steve Spengler, Keith Aughenbaugh, Arnold Palacios, Frank Eliptico, Jude Dickinson, Milton Yoshimoto, Kerry Pate, Clarissa Bearden, Ray Tebuteb, Haidre Eugenio, and Thorne Abbott). Fielded a few questions from meeting participants. Milton and Steve talked with reporter from the Marianas Variety and Steve was interviewed by correspondent from local television station.

Downloaded rainfall data from the Hariguchi, Pizza Hut and Geotesting Building sites. Discussed getting infiltration data from Geotesting. I will revisit Geotesting personnel tomorrow afternoon. I will also revisit Clarissa Tanaka tomorrow afternoon to obtain all of the analytical data that has been generated by the DEQ laboratory on stormwater and groundwater samples previously submitted to the laboratory. Will also revisit Alfred Pangalinian tomorrow morning to obtain the second round of surveying data and to get

Meridian to shoot the elevations of the drainage culverts located in front of the Subway Sandwich shop and at the intersection of Middle and Quartermaster road.

#### Friday, June 28th

Visited the constructed wetland located at American Memorial Park. Discussed the project with Chuck Sayon, the site manager/park ranger for this park. He photocopied some of the operation and maintenance documents prepared for the project site by Winzler and Kelly. Talked with Brian Bearden about this site. Unfortunately, there is no water quality data available for the project. The wetland currently receives brine generated from the Hyatt's desalinization unit. This leads to a high salinity environment which limits the type of vegetation that can grow in the area to mangrove type vegetation. They are currently trying to grow the indigenous mangrove that is found in adjoining wetland areas. The desalinization process appears to lead to concentrated levels of phosphate and nitrates in the brine generated by the desalinization process.

At 13:00, a meeting was held at the office of the legislature for members of a legislative committee (Department of Land and Natural Resources?). Attendees at the meeting included the following legislators: Arnold Palacios, Pedro Castro, Frank Aldam, Tom Tebutub, Danny Quitugua, and Manuel Tenorio. In addition, the governors assistant, Mr. Bob Schwalbach, attended the meeting. Steve Spengler, Anson Murayama, Milton Yoshimoto, Ron Pang, Carl Larson, and Kerry Pate also attended this meeting. The legislators expressed strong support for the project. The meeting lasted two hours.

Collected percolation test data from the files of Geotesting. Unfortunately, the location of individual percolation tests were not generally available. I recorded the following data from the Geotesting files: calculated percolation rate (inches/hour), lithology encountered in test pit, and location, if available.

#### Monday, July 1st

Held a meeting with Brian Bearden of DEQ to discuss the status of the project. Went through the project powerpoint presentation with Brian. Brian suggested that as part of the beneficial impact analysis that we look at utilizing the Uplands Mitigation Bank, which was signed into legislation in January 2002. This program allows a developer to buy credits for use of land that will impact bird habitat. The Fish and Wildlife Service has identified 97 breeding pairs of Reed Warblers for the purposes of the Upland Mitigation Bank. They have suggested that 2.5 hectacres of land are required per breeding pair, but Throne suggests that an area as little as 1/3 acre per pair might be sufficient. A value of \$55,200 per breeding pair was established in a Memorandum of Understanding document signed between CNMI and the Fish and Wildlife Service. Tina De Cruz (DFW) is the local expert on the reed warbler. Met with Throne Abbott of DFW. He provided some additional information about mitigation banks. They are apparently well established for wetland areas on the mainland, especially California. A possible point of contact for more information would be Steve Morgan of Wetlands, Inc. (916-331-8810). Relevant reference for the reed warbler: Recovery Plan for the Nightingale

Reed-Warbler (Acrocephalus luscinia). Published by Region 1, U.S. Fish and Wildlife Service, Portland, Oregon, April 1998, 62 pp.

Met with Rob Carruth of the USGS to discuss the hydrogeology of the inland part of the project watershed. A hydraulic conductivity value of 1,200 feet/day for the Tagpochau/Mariana Limestone is being used in the on-going USGS modeling efforts. The water levels along Middle road are estimated to be approximately 1 feet above sea level, whereas the water levels measured in the Gualo Rai wells range from 3.5 to 4.0 feet above sea level.

Met with Clarissa Tanaka of DEQ. Clarissa provided me with the analytical data that DEQ has been collecting from near-shore monitoring locations within the project watershed and from periodic near-shore groundwater and stormwater samples collected during previous visits.

Met with Max and Mark of AES to show them where to collect stormwater samples for this study. They will provide water quality monitoring equipment. The first samples will be collected from Drains 4, 6, and 11. Additional samples will be collected from the Hafa Adai and Dai Ichi drainage canals. The samples will be collected from an area below the discharge points where concentrated brine enters both drainage channel.

Downloaded the pressure transducer beneath Quartermaster/Middle Road intersection at 18:00. Reinstalled the transducer at 18:30 and reset the sampling interval to 3 minutes from 1 minute.

Downloaded the pressure transducer beneath road in front of Subway at 18:40. Reinstalled the transducer at 18:45 and reset the sampling interval to 3 minutes from 1 minute.

#### Tuesday, July 2nd

Left the island early this morning.

## List of People with Whom Discussions were Held During the June Visit to Saipan

NAME		AGENCY AND TITLE	PHONE	E-MAIL	NOTES	FAX
Jesus	D.L.G. Takai	Director, Div Lands Reg. & Survey	670-322-9018	divlrsgovt@vzpacifica.net	DLNR	322-4039
Keith	Aughenbaugh	U.S. Dept. of Interior, OIA	670-233-9439			
Arnold I.	Palacios	CNMI Legislature	670-664-8830		Chariman	
Kerry	Pate	Deputy Director of CRM	670-664-8300			
Clarissa T.	Bearden	DEQ Laboratory	670-664-8500			
Ray A.	Tebuteb	CNMI Legislature	670-664-8887			
Haidee	Eugenio	Mariana Variety	670-234-6341			
Elaine	Apatang	Correspondent, KMCV7 News	670-235-6369	kmcv.eapatang@saipan.com	Cellular phone: 670-483-0130	235-0965
Thorne	Abbott	Natural Resource Planner	670-664-6025	Thornea@coastalzone.com	Division of Fish & Wildlife	664-6060
Henry S.	Hofschneider	Deputy Commisioner,	670-234-3751	henryhofschneider@yahoo.com	Marianas Public Lands Authority	234-3755
Frank M.	Eliptico	Chief, Real Estate Division	670-234-3751	fme99@hotmail.com	Office of Public Lands, NMI	234-3755
Carl	Larson	CEPOH, RE	808-438-3201		Real Estate Guy for Corp	
Ronald	Pang	Corps of Engineers	808-438-9530			
Mike	Sablan	Marianas Public Land Authority	670-234-3751			
Jude	Dickinson	Marianas Public Land Authority	670-234-3751			
Chuck	Sayon	Site Manager / Park Ranger	670-234-7207	chuck f. sayon@nps.gov		234-6698
Manuel A.	Tenorio	Vice Speaker, House of Representatives	670-664-8939	repten@saipan.com	13th Northern Marianas Legislature	664-8896
Pedro	Castro	Vice Chairman			Vice Chariman	
Frank	Aldam	Committee Member				
Tom	Tebuteb	Committee Member				
Danny	Quitugua	Committee Member				
Bob	Schwalbach	Assistant to President				

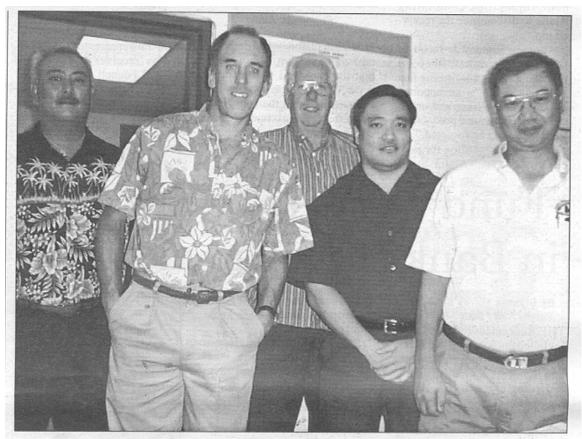
Office of Public Lands, Northern Mariana Islands. P.O. Box 500380 Saipan, MP 96950

DEQ Laboratory, P.O. Box 501304, Saipan, MP

National Park Service, American Memorial Park. P.O. Box 5198 CHRB, Saipan, MP 96950

Manuel Tenorio, P.O. Box 500586, Saipan, MP 96950

Thorne Abbott, PMB #4162, P.O. Box #10002, Saipan, MP 96950



RESTORE THE LAGOON. Officials of the U.S. Army Corps of Engineers and its Hawaii-based contractor Environet, Inc. are on-island for the Saipan lagoon restoration project. From left, Anson Murayama and Dr. Steven Spengler, both from Environet, Carl Larson, Milton Yoshimoto and Ronald Pang of the Army Corps.

Photo by Haldee V. Eugenlo

From Mariana's Variety, July 1, 2002

# **Army Corps presents options** to restore Saipan lagoon

By Haidee V. Eugenio Vanety News Sta"

THE U.S. Anny Corps of Ensineers and its Hawaii-based contractor Environet. Inc. are urging the CNMI government to help in the planned major restoration of Saipan's degrading lagoon.

Yc<tcrday.federal and local officials convened at the Coastal Resources Management to discu-< the five avaolable options to re.tore 1hc "hmd lagoon.

Milton Yo,himoto. project manager of the Amly Corps Honolulu Oi,trict, civil works branch. said the requirements—like providing lunds. easements, right-of-way and necessary relocat ion—need to be enforced her fore lhe acJUal project construction.

··Wilhout locabistance.lhis projec1 may not be realized: said Yoshi111010 during the one-hour mee1ing.

For example, there are five potential sites for the construction of retention/detention basins and wellnnds.

The CNMI government needs 10 ensure thai all lhe privale and public landscovered in the project will be madeavailable along wilh

providing all access roules and relocation of utilities necessary for lhc project construction. its operation and maintenance.

Rep.Amold Palacios.R-Saipan and chairman of the House Comminceon Nutural Resources. said the LegislaiUre and the administration support this project. aut look forward 10 iiS completion.

...We are all one in saying hut we need 10 do something to protect and rc'tore our marine environment: said Palacios. adding thm hbcommiuee may introduce u bill appropriating local fund' for the project.

The options presented by ttle Army Corps and Environct include: no action; collect and convey Mormwaler offshore; con<fluct nelention/detenlinn basins: create con\tructed wetlands: and con, truct combination of relention/detenlion basins and contructed wetlands.

The area under considerulion covers u 1.5-mile length of shoreline in weslern Saipan, from the Garupnn fishing base to the Quarter Masler Road in lersection.

Dr. Steven R. Spengler. senior hydrogeologist of Environet, said a draft CO analysis for each one of the options is expected to be completed in Jan. 2003.

""Thm analysis would include which or the options willgive the be" benefit 10 the environment. and how much would it cost." said Spengler.

In his presentation. Spengler 'aid II he overall project objective i<10 ne'tore degraded ecosySiem 'lructune. function and dynamic proce'-clOalessdegraded.more natuml condition.

.Specilically. an auempt will be made to re-establish. as closely "" po"ible. conditions which would occur in the area in tile absence of hu man changes 10 lhe lan<hcape and hydrology: lle

The analysis will then be presented to the CNMI which will decide "hich of the options to nke.

Representatives from tile Muriana' Public Lands Aulhorily.the Division ofFish and Wildlife and the Division of Environmental Quality were also present during the meeting.



From Mariana's Variety, June 29, 2002

## Summary of Work Tasks Completed during Environet's August 2002 Trip to Saipan

Steve Spengler and Matt Neal of Environet arrived on Saipan on Thursday, August 8<sup>th</sup>. Dr. Spengler and Mr. Neal stayed in Saipan until Saturday August 10<sup>th</sup> at which time they traveled back to Guam for the weekend. They returned to Saipan on the evening of August 11<sup>th</sup>. Ms. Colette Sakoda joined them in Saipan on the evening of August 13<sup>th</sup>. Mr. Spengler, Neal and Ms. Sakoda returned to Honolulu on Friday morning, August 16<sup>th</sup>. A chronological summary of work completed during the visit is given below:

#### Friday, August 9th

Environet personnel installed pressure transducers in monitoring wells located at the Mobil/McDonalds gas station located along Beach Road and the inland Mobil station located along Middle road in Garapan. Survey elevation for the top of casing for both wells used was supplied by Max Simian of AGS. The transducer data will be used to monitor changes in groundwater elevation over a five day period to allow a calculation of overall groundwater gradient for the shallow basal aquifer that underlies the southern portion of Garapan.

At 11:30, we removed the transducer that was in the drainage culvert fronting the Subway sandwich shop along Middle road. We were unsuccessful at downloading the pressure information, since we constantly got an error message as the transducer was completing its download of information. We also apparently overwrote the last months data present on the transducer. We reprogrammed the transducer and installed in the McDonalds well.

Starting at about 2:00 PM, we began sampling 21 near-shore groundwater locations located along the shoreline region of our project area. The samples were collected around the time of low tide. Field measurements were made on the collected groundwater samples as well as samples in Whirlpacks and sample jars to allow us to measure Enterococci, nitrate, phosphate and TDS levels using the colorimetric and turbidity meters supplied by DEQ. A subset of the samples collected was submitted to the DEQ laboratory for microbiological analysis (enterococci).

#### Monday, August 12th

Collected stormwater runoff from an early morning rain event that occurred at about 8:30 AM. Stormwater samples were collected from drains 6, 11 and 14 (Hakubaton Building) as well as from the drainage ditch located in front of the Dai Ichi Hotel.

Stormwater discharge rates were measured at a number of drainage channels during a follow-on rain burst that took place around 9:30 AM. Runoff measurements were also collected from the Quartermaster drainage culvert during the end of this rain event.

Max Simian of AES also sampled this particular storm event. We will submit both sets of stormwater data to Sequoia Analytical for analysis of priority pollutants metals levels (including Barium).

Successfully downloaded the pressure transducer beneath Quartermaster Road. Unfortunately, all of the rain gauges had been inadvertently turned off on June 27<sup>th</sup> and thus no rainfall record is available for the intervening time period. The rain gauges were reactivated around 4:30 PM.

Talked with Peter Houk about the write-up for the historic aerial photograph review and offshore lagoon habitat write-up for the project. Peter will begin working on the write-up this week and will e-mail us the remainder prior to him leaving for Florida.

## Wednesday, August 14th

Held a meeting at 9:00 AM at the offices of CRM. Discussed the land acquisition aspects of the project with members of CRM and the Marianas Public Land Committee? People in attendance included: John Starmer, Vince Castro, Philip Sablan and Benny Pangalinan. Others in attendance include: Steve Spengler, Matt Neal, Colette Sakoda, Milton Yoshimoto and Karl Larson. Discussed any possible land use restrictions for the five tentative locations for retention basins/constructed wetlands. Vince told us that we do not have to consider the Fishing Dock site because of future lease obligations for the site.

Steve and Colette visited Vince Castro to obtain information about land use aspects of the future project. Vince also explained the organization of the CNMI government. Vince informally suggested that a land value of around \$30 a square meter might be more representative for the areas that will be potentially acquired. Steve showed Colette around the island. Photocopied the drainage study that had been previously completed for the Garapan region of Saipan by the Army Corps in 1987.

## Thursday, August 15<sup>th</sup>

Held an information meeting at the chambers of the CNMI legislature to discuss the progress of the project. The legislators had numerous questions about the project. Many

of the questions centered around the funding requirements of the project. The majority of the comments came from the speaker and vice-speaker of the house as well as from representative Atta.

Decided to eliminate the Gualo Rai and Pacific Medical Sites from future consideration. Rather, we will consider evaluating the natural sinkhole site located behind the cock fighting complex which is located Mauka of Middle road.

Steve, Colette and Carl visited the following agencies to obtain additional information about the EIS aspects of the future ecosystem restoration project: DEQ (Brian Beardon), DPW (nobody showed), Division of Historic Preservation (Lon Bulgrin).

## Friday, August 16<sup>th</sup>

Left the island early this morning.

**Key Players from August 2002 Trip** 

NAME		AGENCY AND TITLE	PHONE	E-MAIL	NOTES
					Highway
DI III G	a 11	D	(70.222.0020	177 - 160 - 1	Planning/Fiscal
Philip G.	Sablan	Dept. of Public Works	670-322-9828	phil_tsd@yahoo.com	Coordinator
Vince T.	Castro	Marianas Public Lands Authority	670-234-3751	MPLA@vzpacifica.net	Land Use Manager
vince 1.	Castro	Division of Historic	070-234-3731	<u>MI EA(a) vzpacinca.net</u>	Consulting
Lon	Bulgrin	Preservation	670-664-2122	cnmihpo@itecnmi.com	Archaeologist
	Deleon				Representative, 13th
Joseph P.	Guerrero	House of Representative	670-664-8879	rep.joeguerrero@saipan.com	CNMI Legislature
					Speaker, 13th CNMI
Heinz S.	Hofschneider	House of Representative	670-664-6969	hsh.legis@saipan.com	Legislature
Peter	Houk	DEQ	670-286-5303	p_houk@hotmail.com	Biologist
Steven	Spengler	Environet	808-864-3953	srspengler@hawaii.rr.com	Consultant
Matthew	Neal	Environet	808-833-2225	mneal@hawaii.rr.com	Consultant
Colette	Sakoda	Environet	808-732-8602	sakodac001@hawaii.rr.com	Consultant
Milton	Yoshimoto	USACE	808-438-2250	Milton,T.Yoshimoto@usace.army.mil	Project Coordinator
					Representative, 13th
Melchor	Mendiola	House of Representative	670-664-8845	melchormendiola@hotmail.com	CNMI Legislature
Jessica	Tomokitne	Speakers Office	670-664-6969	tomokanej@saipan.com	
					Representative, 13th
Ray	Tebuteb	House of Representative	670-664-8887	rtebuteb@pacifica.vz.com	CNMI Legislature
Peter	Castro	House of Representative	670-664-8870		Representative, 13th CNMI Legislature
Teter	Castro	House of Representative	070-004-0070		Representative, 13th
Frank	Aldan	House of Representative	670-664-8928	falkan@vzpacifica.net	CNMI Legislature
Ben M.	Taitano	Concerned Citizen	670-234-6004	benmag@usa.com	<u> </u>
Buil 1.11.	Turturio	Marianas Public Lands	0,025.000.	o e mag(w) aba. e o m	Attorney, Interim
Ray	Quichocho	Authority	670-234-3751	rayq@vzpacifica.net	Director?
					Representative, 13th
Juan P.	Tenorio	House of Representative	670-233-8730		CNMI Legislature
Mike A.	Bonah?	House of Representative	670-664-8830		
Benny K.	Pangelinian	CRM	670-664-8304	crm.wahoo@saipan.com	
					Representative, 13th
Benjamin B.	Saman	House of Representative	670-664-8890	repseman@vzpacifica.net	CNMI Legislature
Pete P.	Reyes	CNMI Senate	670-664-8807	pete.reyes@saipan.com	
C: 1		TI CD			Representative, 13th
Stanley	Torres	House of Representative			CNMI Legislature

#### Saipan AER Project Status Report: August, 2002

NAME		AGENCY AND TITLE	PHONE	E-MAIL	NOTES
Jesus	Attao	House of Representative			Representative, 13th CNMI Legislature
Arnold I.	Palacios	House of Representative	670-664-8830	aipalacios@yahoo.com	Chariman, Natural Resources Committee
Clarissa T.	Bearden	DEQ Laboratory	670-664-8500		
Ray A.	Tebuteb	CNMI Legislature	670-664-8887		
Carl	Larson	CEPOH, RE	808-438-3201	carl.a.larson@usace.army.mil	Real Estate Guy for Corp
Manuel A.	Tenorio	Vice Speaker, House of Representatives	670-664-8939	repten@saipan.com	13th Northern Marianas Legislature
Pedro	Castro	Vice Chairman			Vice Chariman
Frank	Aldam	Committee Member			
Tom	Tebuteb	Committee Member			
Danny	Quitugua	Committee Member			

Office of Public Lands, Northern Mariana Islands. P.O. Box 500380 Saipan, MP 96950

DEQ Laboratory, P.O. Box 501304, Saipan, MP

National Park Service, American Memorial Park. P.O. Box 5198 CHRB, Saipan, MP 96950

Department of Public Works, Lower Base, Saipan, MP 96950

Division of Historic Preservation, Department of Community and Cultural Affairs, SPS #741, Box 10006, Saipan, MP 96950 Joseph P. Deleon Guerrero, Representative, P.O. Box 500586, Saipan, MP 96950: web site: www.dreamwater.org/repjguerrero

Heinz. S. Hofschneider, Speaker, P.O. Box 500586, Saipan, MP 96950

Peter Houk, Pacific Marine Resource Institute, PMB 1156, P.O. Box 10003, Saipan, MP 96950

#### Summary of Visit to Saipan from 4/4/04 to 4/7/04.

Flew to Saipan on 4/4/04.

4/5/04: Met with Jack Salas, Steve Tilley, Milton Yoshimoto at the CRM office from 7:30 to 8:30 to discuss the Saipan AER project. It was decided at this meeting to extend the project area to the northern property boundary of the Hafa Adai hotel, so that the Cock Fighting Arena site could be included in the restoration analysis.

Gave a powerpoint presentation to members of the Saipan legislature from 9:15 to 10:45. Attendees at the meeting included Jack Salas, Steve Tilley, Milton Yoshimoto, Uyen Tran, Steve Spengler, Timothy Villagomez, Clyde Norita, Miram Seman, and three other legislators who did not provide business cards. After the powerpoint presentation, there was a lot of talk about the funding aspect of the project and the timing of when funds needed to be committed.

From 11:00 to 11:30, Milton, Steve, Uyen, Jack and Steve Tilley went to the shoreline in front of the Hafa Adai in order to verify the location of the extended northern boundary of the project.

Steve, Uyen Hilary and Kathy visited the cock fighting arena site and the ephemeral stream gulch to view the proposed restoration system for this area.

4/6/04: Met with Brian and returned the copy of his design plan for the wetlands informational trail. Obtained a copy of a prior Corp reconnaissance trip report for Lake Susupe. Obtained a copy of a detailed shape file for Saipan from Ken Cochrain. Got some new publications from the technician (George?) who was present at the USGS office. Talked with Genevieve Cabrera of the Division of Historic Preservation about the previous work that has been conducted in the Lake Susupe area. She said that a detailed study and analysis of cores collected by archaeologists from the middle of Lake Susupe, which will describe the flora and changes that have occurred within the Lake over the past 7000 years, will be submitted by Steve Athens and his archaeological firm within the next month. Genevieve also said that she would e-mail me some files of previous stratigraphic chronology work conducted by other researchers.

Noticed that the proposed China House site had been extensively cleared of vegetation recently. This area is apparently owned by Perry Tenorio who would like to turn the area into a driving range. There is a retention basin present at the site but the temporary weir installed to hold back runoff crossing the property is woefully inadequate.

List of Key Players from the April 2004 Trip

NAME		AGENCY AND TITLE	PHONE	E-MAIL	NOTES
Pete	Palacios	Assistant Director, DEQ	670-664-8500	pete.palacios@saipan.com	DLNR
John L.	Castro, Jr.	Director, DEQ	670-664-8500	deq.director@saipan.com	
Genevieve S.	Cabrera	Historian, Division of Historic Preservation	670-664-2120	gscab63@vzpacifica.net	Division of Historic Preservation
Epi	Cabrera	Director, Division of Historic Preservation	670-664-2120		
Steve	Tilley	Deptuy Director, CRM	670-664-8307	steve.tilley@crm.gov.mp	www.crm.gov.mp
Hilary	Stevens	Natural Resources Specialist	670-664-8300	hilary.stevens@crm.gov.mp	
Kathy	Yuknavage	Natural Resource Planner	670-664-8300	kathy.yuknavage@crm.gov.mp	
Jack D.	Salas	Director, CRM	670-664-8300	crm.director@saipan.com	
Clyde K.	Norita	Chairman, Committee on Federal and Foreign Relations	670-664-8987	clydenorita@aol.com	P.O. Box 500341 Saipan, MP 96950
Timothy P.	Villagomez	Vice Speaker and Chariman, Public Utilities, Transportation and Communication, PUTC	670-664-8820	tpvillagomez@itecnmi.com	P.O. Box 500586 Saipan, MP 96950
Miriam K.	Seman	Executive Assistant, Office of the Speaker	670-664-8971	mkseman@saipan.com	P.O. Box 501182 Saipan MP 96950
Brian	Bearden	DEQ			
Ken	Cochran	CRM		ken.cochran@crm.gov.mp	GIS guy for CRM
Steve	Spengler	Environet, Inc.			
Milton	Yoshimoto	Army Corps			
Uyen	Tran	Army Cpros			

Meetings held on April 6, 2004

Division of Environmental Quality, CNMI, 3rd Floor Morgen Building, San Jose, P.O. Box 501304, Saipan, MP 96950 Division of Historic Preservation, Department of Community and Cultural Affairs, Caller Box 10007, Airport Road, Saipan, MP 96950

 $Coastal\ Resources\ Management, P.O.\ Box\ 10007, Second\ Floor\ Morgen\ Bldg., San\ Jose, Saipan, MP\ 96950.$ 



Project: Saipan Aquatic Ecosystem Restoration Study

Project No.: F01-009
Date: July 27, 2004

Subject: July 20<sup>th</sup> Site Visit – Trip Summary

#### **Summary:**

Site Visit – 20 July 2004 James Pennaz, USACE and Ryan Yamauchi, EI

09:00 Met with CRM at CRM Office Conference Room

Attendees: Mr. Jack Salas, CRM; Mr. Benny Pangelinan, CRM; Mr. Michael Tenorio, Equitable Realty

Discussion of Mr. Tenario's property (China House Detention Basin Site):

- Mr. Tenario is currently working with DPW to get a permit for the development of a driving range on the property.
- Mr. Tenario is willing to grant a 10-foot drainage easement along the southern and western boundaries to allow for transport of storm water.
- A small detention basin has been already been constructed in the northwestern corner of the property. Mr. Tenario is willing to allow continued use of this corner as a detention basin and may be able to get two additional adjacent family parcels for use as a detention basin.
- Drainage from the detention basin is the existing natural drainage way.

#### Discussion of Design:

- Mr. Yamauchi discussed complexities with CRM regarding the lack of a master plan for the storm drainage system and potential creation of new flooding areas should the transport system be altered. Mr. Salas suggested that we discuss this with DEQ.
- CRM wants EI to identify which of the parcels are required for the three different areas identified. CRM would like to start the process of property acquisition soon, so that further developments are not planned within the parcels required.

#### 10:00 - 12:00

Escorted by Benny to the China House site. Walked the site to observe the construction on Mr. Tenario's property. Observed that the downstream drainage way was overtopped during the last heavy rainfall event.

Escorted by Benny to the Arena site. Observed that the majority of the excavated quarry area has been filled. Drove the area upgradient from the Arena site.



Observed that a few unpaved roads were washed out/damaged due to last heavy rainfall event. Drainage in this area is overland flow in a number of directions. There are no distinct drainage features.

### 13:30 Met with Brian Bearden, DEQ.

Brian mentioned that DPW was starting on a drainage master plan for the study area, but this may be a few years away from completion.

The drainage standards/manuals will be adopted sometime next year.

The western side of the island will be considered Section 303 impaired, thus requiring establishment of TMDLs.

Brian understands the complexities of not having an existing drainage system and master plan for study area. Brian suggested that we try to design basins that best fit based on the constraints given to us.

#### 14:30

Escorted by Benny to the Quartermaster site. Observed that the grade difference between Middle Road and the underlying parcels would allow for development of a detention basin.

Based on the discussions with CRM and DEQ, Jim and Ryan discussed the options and decided that the design should incorporate the design of the detention basins only, since the intent of this project is to affect water quality in the lagoon rather than flood control. This may be accomplished a number of ways. One suggestion from Jim would be to put a low flow pipe to the detention pond, which would capture the first flush flows with larger flows overflowing to the existing natural drainage ways. This would allow for treatment without causing new and different flooding areas. An evaluation of the portion of treatment expected/achievable for the different storm events (i.e. 1-yr, 2-yr, 10-yr) will be conducted (see attached sketch). Costs and benefits will also be considered.

The lots for each of the sites were generally evaluated to determine the optimum placement of the detention basins. Selected lots were identified during the site visit.

#### Summary of Visit to Saipan from 10/24/11 to 10/28/11.

The project team arrived in Saipan on 10/23/11.

10/24/11: Meeting at the Commonwealth of the Northern Mariana Islands (CNMI) Coastal Resources Management (CRM) office.

#### Attendees:

CNMI CRM: Rose Pangelinan, Ana C. Agulto, Rita Chang, Rachel Zuercher

CNMI Department of Public Works (DPW): Oscar Pangelinan

CNMI Department of Environmental Quality (DEQ): Ryan Okano, Clarissa T. Bearden

National Oceanic and Atmospheric Administration (NOAA): Dana Okano

CNMI Department of Public Lands (DPL): Patricia Seman Rasa

CNMI OMB: Virginia Villagomez

United States Army Corps of Engineers (USACE): Milton Yoshimoto, Kevin Nishimura

Community Planning and Engineering (CPE): Anson Murayama, Frank Camacho

Environet: Sonia Shjegstad, Miya Akiba, Max Solmssen

#### 13:40- meeting began

USACE presented the project history to the group, as well as plans for the project moving forward. The project lost funding prior to the completion of the draft Environmental Assessment (EA)/Environmental Restoration Report (ERR) in 2007. The project has received funding again and has restarted. USACE is anticipated to fund the completion of the EA/ERR, as well as the design of the detention/retention basins. The USACE may be able to fund 65 percent of construction costs, but the CNMI will be responsible for the remainder of construction costs, along with the ongoing operation and maintenance of the detention/retention basins.

Environet gave a power point presentation detailing the project location, history and plans for moving forward.

NOAA asked how the project area was determined since there were runoff issues affecting the lagoon from locations outside the project area.

USACE responded that there were limited public lands available for the project, and that the best available sites were chosen given these land use restraints.

Environet then discussed data needs in preparing the EA/ERR with several members of the attendees, and informal meetings to exchange data later in the week were established.

USACE advised that funding for the construction of the project from USACE is limited, but it may be possible for the CNMI to secure federal funds from outside the USACE to finance their portion of the project costs.

CPE identified the following top three local cooperator responsibilities identified in the presentation as the primary project goals that would help to avoid runoff within the project site conjunction with the construction of the detention/retention basins:

- 1. Pave or armor unpaved roads that contribute majority of sediment to lagoon
- 2. Conduct sanitary sewer surveys and repair damaged portions of sewer system
- 3. Extend sewer lines to replace septic and cesspool systems in watershed

CNMI DPW stated that the implementation of the project should be coordinated with the CNMI Commonwealth Utilities Corporation (CUC).

CRM agreed to coordinate a meeting with CPE, USACE and the CUC on Wednesday, October 26, 2011.

15:00- meeting adjourned.

10/25/2011: Meeting at CNMI Legislator

#### Attendees:

CNMI Legislature: Representative Joseph M. Palacios, Chairman;

Speaker Eliceo D. Cabrera;

Floor Leader George N. Camacho;

Representative Ramon A. Tebuteb, SNILD Chair Representative;

Stanley T. McGinnis Torres, PUTC Chair Representative;

Ramon S. Basa, Ways & Means Chair Representative;

Rafael S. Demapan, JGO Chair;

Representative Fredrick P. Deleon Guerrero, FFA Chair;

Representative Joseph P. Deleon Guerrero, Minority Leader; and

Representative Antonio P. Sablan.

USACE: Milton Yoshimoto, Kevin Nishimura

CNMI CRM: Rachael Zuercher

CPE: Anson Murayama, Frank Camacho

Environet: Sonia Shjegstad, Miya Akiba, Max Solmssen

#### 10:00-Meeting began.

Chairman Palacios welcomed committee members and presenters, and formal introductions were made.

Chairman Palacios called on USACE to conduct the presentation on the Saipan Lagoon Aquatic Ecosystem Restoration Project.

USACE gave a brief project history.

Environet and USACE gave power point presentation detailing project history and planned schedule for current project. USACE outlined the proposed cost sharing for the project budget, and stated that USACE funds are limited to support the design phase of the project, and possibly portions of the construction phase. The CNMI would be responsible for securing funds for a portion of the construction costs, as well as all of the costs associated with ongoing operation and maintenance of the retention/detention basins.

Floor Leader Camacho asked if USACE was planning to address runoff in the Garapan area.

USACE responded that the current project area does not include the Garapan runoff areas. Chairman Palacios voiced concern for investigating possibly contaminated soil areas on Saipan.

USACE responded that the USACE environmental division should be contacted and may be able to help.

11:00: meeting was adjourned.

#### Saipan Lagoon Restoration Project Status Report: October, 2011

10/25/2011: meeting at CNMI DPW

#### Attendees:

CNMI DPW: Martin Sablan, Sonya Dancoe, Tony Camacho

CNMI CRM: Rachael Zuercher

USACE: Milton Yoshimoto, Kevin Nishimura CPE: Anson Murayama, Frank Camacho

Environet: Sonia Shjegstad, Miya Akiba, Max Solmssen

13:30-Meeting began

#### Introductions

USACE delivered brief project background.

Environet and USACE gave power point presentation detailing project history and planned schedule for current project. USACE outlined the proposed cost sharing for the project budget, and stated that USACE funds are limited to support the design phase of the project, and possibly portions of the construction phase. The CNMI would be responsible for securing funds for a portion of the construction costs, as well as all of the costs associated with ongoing operation and maintenance of the retention/detention basins.

CNMI DPW informed USACE of the CNMI Hazard Reduction Project that is planned to include repaving and striping of Beach Road. CNMI DPW stated that identifying lands for the proposed project will be a challenge.

CPE and CNMI DPW agreed to share information and stay in close communication regarding the planning and implementation of both the proposed detention/retention basins, and the CNMI DPW hazard reduction project.

CNMI DPW stated that the operation and maintenance of the detention/retention basins may be a problem due to lack of funding.

CPE stated that they will work to incorporate specifications in the design of the basins to allow for less maintenance. However, the design must also adhere to current CNMI DEQ standards.

CNMI DPW provided CPE with the scope of work for a portion of the Hazard Reduction Project, and stated that there may be opportunities for partial funding of the detention/retention basin project as a capital improvement project.

CNMI DPW and CPE discussed different design options that would work. CNMI DPW suggested detention basin at American Memorial Park as a good example of an acceptable "wet pond" that adheres to CNMI DEQ standards.

14:40-Meeting adjourned.

#### 10/26/2011

9:30-Environet and CNMI CRM met with Marine Biologist Mr. Peter Hauk of the Pacific Marine Resources Institute to obtain data for the project.

10:15- Environet and CNMI CRM met with Michael C. Tenorio from CNMI Division of Fish & Wildlife Fisheries Research Section to gather data.

10:30- Environet and CNMI CRM met with Lee Perlow from CNMI Department of Lands and Natural Resources, Division of Fish and Wildlife to consult regarding the presence of important biological species at the proposed retention/detention basin sites. 11:00-11:30- Environet, CPE and CRM conducted site visits to the Arena Site, China

14:00- Meeting at Legislator

Attendees:

CNMI Governor: Mr. Benigno Repeki Fitial

CNMI CRM: Rachael Zuercher

House Site and Quartermaster Site.

USACE: Milton Yoshimoto, Kevin Nishimura CPE: Anson Murayama, Frank Camacho Environet: Miya Akiba, Max Solmssen

#### 14:30-Meeting began

Introductions

Environet and USACE gave power point presentation detailing project history and planned schedule for current project. USACE outlined the proposed cost sharing for the project budget, and stated that USACE funds are limited to support the design phase of the project, and possibly portions of the construction phase. The CNMI would be responsible for securing funds for a portion of the construction costs, as well as all of the costs associated with ongoing operation and maintenance of the retention/detention basins.

Governor Fitial made inquiries regarding budget, and concerns about sedimentation in the lagoon. He stated that land acquisition of private lands for a public purpose is allowed under CNMI laws.

15:30-Meeting adjourned.

#### 10/27/2011

- 8:30: Environet met with CNMI CRM to obtain additional data needs.
- 9:15: Environet met with Clarissa T. Bearden from CNMI DEQ to obtain water quality data needs. Environet contacted CNMI Historical Preservation Office (HPO) to begin the Section 106 consultation process.

10:00-14:00: Environet conducted site visits to previously identified potentially contaminating activities (PCAs) within the project area, as well as searched for any new PCAs within the project area.

#### 10/28/2011

8:30-11:30: Environet continued search of the project area for existing and new PCAs End of Trip Report.

#### May 18, 2002

## Subject: Summary of Work Tasks Completed during Environet's May 2002 Trip to Saipan

Steve Spengler and Matt Neal of Environet arrived on Saipan on Monday, May 6<sup>th</sup>. Dr. Spengler stayed in Saipan until Wednesday May 15<sup>th</sup> while Mr. Neal stayed on the island until May 12<sup>th</sup>. Dr. Spengler spent a day on Guam on May 15<sup>th</sup>, returning to Honolulu on May 16<sup>th</sup>.

The table below lists the people who were contacted during this visit to discuss various aspects of the Saipan Aquatic Ecosystem Restoration project.

NAME		AGENCY AND TITLE	PHONE	NOTES
Jack	Salas	CRM, Chief Enforcement	670-234 6623	Co-Sponser
Doug	Mauro	CRM	670-234-6623	GIS / CAD
Brian	Bearden	DEQ	670-664 8510	
Clarrissa	Tanaka	DEQ, Chemist	670-664 8500	Water Quality Data
Peter	Houk	DEQ, Marine Fishery	670-664 8504	Aquatic Biologist
Vince	Castro	DLNR	670-234-3751	GIS Atlas / Dept of Public Lands
Robert	Carruth	USGS	670-322 2060	Rainfall Data
John	Starmer	CRM	670-234-6623	Aquatic Biologist
Thorne	Abbott	U.S. Fish and Wildlife Service	670-664-6025	Wetlands Specialist
Kate	Moots	Dept of Fish and Wildlife	670-664-6019	Fisheries Biologist III
Michael	Trianni	Dept of Fish and Wildlife	670-664-6018	Sea Cucumbers / survey info
Steve	Spengler	Environet	808-833-2225	Environet Project Manager
Matthew	Neal	Environet	808-833-2225	Environet Task Manager
Joe	Kaipat	Safe Drinking Water Branch Manager	670-664-8509	DEQ: Manager Safe Drinking Water
Robert	York	Northern Mariana Islands Museum	670-664-2160	Curator
Gigi	York	Northern Mariana Islands Museum	670-664-2160	Collection Curator
Lon	Bulgrin	Division of Historic Preservation	670-664-2122	Consulting Archaeologist
Becky	Lazama	CRM-Wetlands Material		Geotechnical Company: Perc Test
Scott	Russell	Council of the Humanities		Archaeology Expert and Author
Jun	Beltran	Geotesting	670-235-6000	
lke	Cabrera	Former DEQ head	670-483-8426	
Pete	Baubata	Head of CUC Laboratory		
Harold	Wood	Laboratory Manager for WERI	671-735-2688	303 University Dr. UOG Station
				Mangilao, Guam 96923

Division of Fish & Wildlife, PMB 2761, P.O. Box 10002, Saipan MP 96950
Division of Environmental Quality, P.O. Box 501304, Saipan MP 96950
Northern Mariana Islands Museum, P.O. Box 504570, Saipan MP 96950
Division of Historic Preservation, SPS #741, Box 10006, Saipan, MP 96950

The major tasks completed during this site visit are summarized below:

- Downloaded pressure transducer and rainfall data from monitoring locations at the Hariguchi and Pizza Hut Buildings as well as from beneath the intersection of Quartermaster and Middle roads.
- ➤ Reviewed aerial and other photograph database available at the University of Northern Marianas Pacific Collection laboratory.
- ➤ Retrieved AutoCAD images for the shoreline delta areas from Meridian Surveying.
- Reviewed As-Build Drawings from the Phase 4 road improvements along Middle Road that were completed in 1992.
- ➤ Discussed potential restoration alternatives with three employees of the Fish and Wildlife Service and the Department of Fisheries.
- ➤ Installed a pressure transducer in the drainage culvert beneath Middle road across the street from the Subway Sandwich shop.
- ➤ Talked with Jun Beltran of Geotesting about compiling percolation data for the project watershed.
- Installed a third automated rain guage on top of the Geotesting Building.
- ➤ Collected stormwater samples from Drains Number 6, 11 and 13 between 6 to 6:30 AM. Submitted samples to DEQ laboratory (left with Marvin) for nutrient and microbial analysis at about 8:30 AM.
- ➤ Did a quick reconnaissance tour of four potential future wetlands/retention basin sites present within the project watershed: Fishing Dock area, Drain 7 Area (located south of Wendy's), Quartermaster Road Area, and Gualo Rai wetland area. A fifth potential site exists just to the south of the new emergency medical facility located along Middle road.
- ➤ Collected 21 groundwater samples from along the shoreline at low tide between 13:40 and 15:57. Primary sample locations were located at 0.2-mile intervals in moving south from the Fishing Dock. Secondary locations were located at 0.1-mile and 262-foot intervals in the vicinity of the Drain 7 wetland and the Drain 6 site. Analyzed samples in the field for temperature, conductance and pH. The following nine shallow, near-shore groundwater samples were submitted to DEQ for nitrate analysis: GWI-24, GWI-26, GWI-14, GWI-28, GWI-29, GWI-17, GWI-19, GWI-21 and GWI-23.

## Summary of Work Tasks Completed during Environet's August 2002 Trip to Saipan

Steve Spengler and Matt Neal of Environet arrived on Saipan on Thursday, August 8<sup>th</sup>. Dr. Spengler and Mr. Neal stayed in Saipan until Saturday August 10<sup>th</sup> at which time they traveled back to Guam for the weekend. They returned to Saipan on the evening of August 11<sup>th</sup>. Ms. Colette Sakoda joined them in Saipan on the evening of August 13<sup>th</sup>. Mr. Spengler, Neal and Ms. Sakoda returned to Honolulu on Friday morning, August 16<sup>th</sup>. A chronological summary of work completed during the visit is given below:

#### Friday, August 9th

Environet personnel installed pressure transducers in monitoring wells located at the Mobil/McDonalds gas station located along Beach Road and the inland Mobil station located along Middle road in Garapan. Survey elevation for the top of casing for both wells used was supplied by Max Simian of AGS. The transducer data will be used to monitor changes in groundwater elevation over a five day period to allow a calculation of overall groundwater gradient for the shallow basal aquifer that underlies the southern portion of Garapan.

At 11:30, we removed the transducer that was in the drainage culvert fronting the Subway sandwich shop along Middle road. We were unsuccessful at downloading the pressure information, since we constantly got an error message as the transducer was completing its download of information. We also apparently overwrote the last months data present on the transducer. We reprogrammed the transducer and installed in the McDonalds well.

Starting at about 2:00 PM, we began sampling 21 near-shore groundwater locations located along the shoreline region of our project area. The samples were collected around the time of low tide. Field measurements were made on the collected groundwater samples as well as samples in Whirlpacks and sample jars to allow us to measure Enterococci, nitrate, phosphate and TDS levels using the colorimetric and turbidity meters supplied by DEQ. A subset of the samples collected was submitted to the DEQ laboratory for microbiological analysis (enterococci).

### Monday, August 12th

Collected stormwater runoff from an early morning rain event that occurred at about 8:30 AM. Stormwater samples were collected from drains 6, 11 and 14 (Hakubaton Building) as well as from the drainage ditch located in front of the Dai Ichi Hotel.

Stormwater discharge rates were measured at a number of drainage channels during a follow-on rain burst that took place around 9:30 AM. Runoff measurements were also collected from the Quartermaster drainage culvert during the end of this rain event.

Max Simian of AES also sampled this particular storm event. We will submit both sets of stormwater data to Sequoia Analytical for analysis of priority pollutants metals levels (including Barium).

Successfully downloaded the pressure transducer beneath Quartermaster Road. Unfortunately, all of the rain gauges had been inadvertently turned off on June 27<sup>th</sup> and thus no rainfall record is available for the intervening time period. The rain gauges were reactivated around 4:30 PM.

Talked with Peter Houk about the write-up for the historic aerial photograph review and offshore lagoon habitat write-up for the project. Peter will begin working on the write-up this week and will e-mail us the remainder prior to him leaving for Florida.

## Wednesday, August 14th

Held a meeting at 9:00 AM at the offices of CRM. Discussed the land acquisition aspects of the project with members of CRM and the Marianas Public Land Committee? People in attendance included: John Starmer, Vince Castro, Philip Sablan and Benny Pangalinan. Others in attendance include: Steve Spengler, Matt Neal, Colette Sakoda, Milton Yoshimoto and Karl Larson. Discussed any possible land use restrictions for the five tentative locations for retention basins/constructed wetlands. Vince told us that we do not have to consider the Fishing Dock site because of future lease obligations for the site.

Steve and Colette visited Vince Castro to obtain information about land use aspects of the future project. Vince also explained the organization of the CNMI government. Vince informally suggested that a land value of around \$30 a square meter might be more representative for the areas that will be potentially acquired. Steve showed Colette around the island. Photocopied the drainage study that had been previously completed for the Garapan region of Saipan by the Army Corps in1987.

## Thursday, August 15<sup>th</sup>

Held an information meeting at the chambers of the CNMI legislature to discuss the progress of the project. The legislators had numerous questions about the project. Many

of the questions centered around the funding requirements of the project. The majority of the comments came from the speaker and vice-speaker of the house as well as from representative Atta.

Decided to eliminate the Gualo Rai and Pacific Medical Sites from future consideration. Rather, we will consider evaluating the natural sinkhole site located behind the cock fighting complex which is located Mauka of Middle road.

Steve, Colette and Carl visited the following agencies to obtain additional information about the EIS aspects of the future ecosystem restoration project: DEQ (Brian Beardon), DPW (nobody showed), Division of Historic Preservation (Lon Bulgrin).

### Friday, August 16th

Left the island early this morning.

**Key Players from August 2002 Trip** 

NAME		AGENCY AND TITLE	PHONE	E-MAIL	NOTES
					Highway
Philip G.	Sablan	Dept. of Public Works	670-322-9828	phil_tsd@yahoo.com	Planning/Fiscal Coordinator
Tillip G.	Saulan	Marianas Public Lands	070-322-9828	pini tsd@yanoo.com	Coordinator
Vince T.	Castro	Authority	670-234-3751	MPLA@vzpacifica.net	Land Use Manager
Lon	Bulgrin	Division of Historic Preservation	670-664-2122	cnmihpo@itecnmi.com	Consulting Archaeologist
Joseph P.	Deleon Guerrero	House of Representative	670-664-8879	rep.joeguerrero@saipan.com	Representative, 13th CNMI Legislature
Heinz S.	Hofschneider	House of Representative	670-664-6969	hsh.legis@saipan.com	Speaker, 13th CNMI Legislature
Peter	Houk	DEQ	670-286-5303	p_houk@hotmail.com	Biologist
Steven	Spengler	Environet	808-864-3953	srspengler@hawaii.rr.com	Consultant
Matthew	Neal	Environet	808-833-2225	mneal@hawaii.rr.com	Consultant
Colette	Sakoda	Environet	808-732-8602	sakodac001@hawaii.rr.com	Consultant
Milton	Yoshimoto	USACE	808-438-2250	Milton.T.Yoshimoto@usace.army.mil	Project Coordinator
Melchor	Mendiola	House of Representative	670-664-8845	melchormendiola@hotmail.com	Representative, 13th CNMI Legislature
Jessica	Tomokitne	Speakers Office	670-664-6969	tomokanej@saipan.com	
Ray	Tebuteb	House of Representative	670-664-8887	rtebuteb@pacifica.vz.com	Representative, 13th CNMI Legislature
Peter	Castro	House of Representative	670-664-8870		Representative, 13th CNMI Legislature
Frank	Aldan	House of Representative	670-664-8928	falkan@vzpacifica.net	Representative, 13th CNMI Legislature
Ben M.	Taitano	Concerned Citizen	670-234-6004	benmag@usa.com	
Ray	Quichocho	Marianas Public Lands Authority	670-234-3751	rayq@vzpacifica.net	Attorney, Interim Director?
Juan P.	Tenorio	House of Representative	670-233-8730	_	Representative, 13th CNMI Legislature
Mike A.	Bonah?	House of Representative	670-664-8830	_	
Benny K.	Pangelinian	CRM	670-664-8304	crm.wahoo@saipan.com	
Benjamin B.	Saman	House of Representative	670-664-8890	repseman@vzpacifica.net	Representative, 13th CNMI Legislature
Pete P.	Reyes	CNMI Senate	670-664-8807	pete.reyes@saipan.com	
Stanley	Torres	House of Representative		_	Representative, 13th CNMI Legislature

#### Saipan AER Project Status Report: August, 2002

NAME		AGENCY AND TITLE	PHONE	E-MAIL	NOTES
Jesus	Attao	House of Representative		_	Representative, 13th CNMI Legislature
Arnold I.	Palacios	House of Representative	670-664-8830	aipalacios@yahoo.com	Chariman, Natural Resources Committee
Clarissa T.	Bearden	DEQ Laboratory	670-664-8500		
Ray A.	Tebuteb	CNMI Legislature	670-664-8887		
Carl	Larson	CEPOH, RE	808-438-3201	carl.a.larson@usace.army.mil	Real Estate Guy for Corp
Manuel A.	Tenorio	Vice Speaker, House of Representatives	670-664-8939	repten@saipan.com	13th Northern Marianas Legislature
Pedro	Castro	Vice Chairman			Vice Chariman
Frank	Aldam	Committee Member		_	
Tom	Tebuteb	Committee Member		_	
Danny	Quitugua	Committee Member		_	

Office of Public Lands, Northern Mariana Islands. P.O. Box 500380 Saipan, MP 96950

DEQ Laboratory, P.O. Box 501304, Saipan, MP

National Park Service, American Memorial Park. P.O. Box 5198 CHRB, Saipan, MP 96950

Department of Public Works, Lower Base, Saipan, MP 96950

Division of Historic Preservation, Department of Community and Cultural Affairs, SPS #741, Box 10006, Saipan, MP 96950 Joseph P. Deleon Guerrero, Representative, P.O. Box 500586, Saipan, MP 96950: web site: www.dreamwater.org/repjguerrero

Heinz. S. Hofschneider, Speaker, P.O. Box 500586, Saipan, MP 96950

Peter Houk, Pacific Marine Resource Institute, PMB 1156, P.O. Box 10003, Saipan, MP 96950

#### September Saipan Trip Summary

Arrive Monday September 16, at 9:00 PM.

#### Tuesday, September 17

- 1) Met with Jack Salas to deliver new wetland site landowner figures. CRM will continue pursuing Right of Entry information from the revised list of landowners.
- 2) Met with John Starmer to discuss lagoon sediment sampling strategy.
- 3) Began stormwater collection system inventory.
- 4) Met with Starmer to turn over sampling gear and containers for the lagoon sediment sampling.

#### Wednesday, September 18

1) Completed lagoon sediment sampling, a total of 18 composite samples were collected from six transects ranging from the near-shore enhalus beds to the offshore enhalus beds located beyond the current channel. The purpose of this exercise is to help determine the extent of contamination within sediment in the lagoon. Four sampling transects were located corresponding to the most heavily sedimented stormwater outfalls along Beach Road within the project area. A single transect was located north of the project site, corresponding to the Dai Ichi Hotel drainage outfall, typically one of the most heavily contaminated areas of the lagoon. Finally, a single transect was located south of the project site, corresponding to the San Jose wetland.

#### Thursday, September 19

- 1) Continued storm water system inventory and measurement (measured culverts, catch basins, retention swales, etc).
- 2) Observed and document stormwater drainage channels, ponding areas within the project site.
- 3) Measured stormwater volume at the Quartermaster/Middle Road intersection.
- 4) Removed pressure transducers from both the Quartermaster and Subway sites.

#### Friday, September 20

- 1) Due to heavy rain and flooding, Proceeded to measure and record stormwater flow volumes along both Beach and Middle Roads several times during the duration of the heavy rain.
- 2) Downloaded data from three rainguages (Harahuchi Bldg, Pizza Hut Bldg, and Geotesting Bldg).
- 3) Downloaded data from both the Quartermaster and Subway transducers and returned them to their respective locations.

#### Saturday, September 21

- 1) Conduct reconnaissance and documentation of flood debris from heavy rains that occurred on Friday.
- 2) Conducted reconnaissance and measurements of the Cock Fight potential constructed wetland site.
- 3) Completed final check of the rainguages, returned field gear to DEQ laboratory.

#### Summary of Visit to Saipan from 4/4/04 to 4/7/04.

Flew to Saipan on 4/4/04.

4/5/04: Met with Jack Salas, Steve Tilley, Milton Yoshimoto at the CRM office from 7:30 to 8:30 to discuss the Saipan AER project. It was decided at this meeting to extend the project area to the northern property boundary of the Hafa Adai hotel, so that the Cock Fighting Arena site could be included in the restoration analysis.

Gave a powerpoint presentation to members of the Saipan legislature from 9:15 to 10:45. Attendees at the meeting included Jack Salas, Steve Tilley, Milton Yoshimoto, Uyen Tran, Steve Spengler, Timothy Villagomez, Clyde Norita, Miram Seman, and three other legislators who did not provide business cards. After the powerpoint presentation, there was a lot of talk about the funding aspect of the project and the timing of when funds needed to be committed.

From 11:00 to 11:30, Milton, Steve, Uyen, Jack and Steve Tilley went to the shoreline in front of the Hafa Adai in order to verify the location of the extended northern boundary of the project.

Steve, Uyen Hilary and Kathy visited the cock fighting arena site and the ephemeral stream gulch to view the proposed restoration system for this area.

4/6/04: Met with Brian and returned the copy of his design plan for the wetlands informational trail. Obtained a copy of a prior Corp reconnaissance trip report for Lake Susupe. Obtained a copy of a detailed shape file for Saipan from Ken Cochrain. Got some new publications from the technician (George?) who was present at the USGS office. Talked with Genevieve Cabrera of the Division of Historic Preservation about the previous work that has been conducted in the Lake Susupe area. She said that a detailed study and analysis of cores collected by archaeologists from the middle of Lake Susupe, which will describe the flora and changes that have occurred within the Lake over the past 7000 years, will be submitted by Steve Athens and his archaeological firm within the next month. Genevieve also said that she would e-mail me some files of previous stratigraphic chronology work conducted by other researchers.

Noticed that the proposed China House site had been extensively cleared of vegetation recently. This area is apparently owned by Perry Tenorio who would like to turn the area into a driving range. There is a retention basin present at the site but the temporary weir installed to hold back runoff crossing the property is woefully inadequate.

List of Key Players from the April 2004 Trip

NAME		AGENCY AND TITLE	PHONE	E-MAIL	NOTES
Pete	Palacios	Assistant Director, DEQ	670-664-8500	pete.palacios@saipan.com	DLNR
John L.	Castro, Jr.	Director, DEQ	670-664-8500	deq.director@saipan.com	
Genevieve S.	Cabrera	Historian, Division of Historic Preservation	670-664-2120	gscab63@vzpacifica.net	Division of Historic Preservation
Epi	Cabrera	Director, Division of Historic Preservation	670-664-2120		
Steve	Tilley	Deptuy Director, CRM	670-664-8307	steve.tilley@crm.gov.mp	www.crm.gov.mp
Hilary	Stevens	Natural Resources Specialist	670-664-8300	hilary.stevens@crm.gov.mp	
Kathy	Yuknavage	Natural Resource Planner	670-664-8300	kathy.yuknavage@crm.gov.mp	
Jack D.	Salas	Director, CRM	670-664-8300	crm.director@saipan.com	
Clyde K.	Norita	Chairman, Committee on Federal and Foreign Relations	670-664-8987	clydenorita@aol.com	P.O. Box 500341 Saipan, MP 96950
Timothy P.	Villagomez	Vice Speaker and Chariman, Public Utilities, Transportation and Communication, PUTC	670-664-8820	tpvillagomez@itecnmi.com	P.O. Box 500586 Saipan, MP 96950
Miriam K.	Seman	Executive Assistant, Office of the Speaker	670-664-8971	mkseman@saipan.com	P.O. Box 501182 Saipan MP 96950
Brian	Bearden	DEQ			
Ken	Cochran	CRM		ken.cochran@crm.gov.mp	GIS guy for CRM
Steve	Spengler	Environet, Inc.			
Milton	Yoshimoto	Army Corps			
Uyen	Tran	Army Cpros			

Meetings held on April 6, 2004

Division of Environmental Quality, CNMI, 3rd Floor Morgen Building, San Jose, P.O. Box 501304, Saipan, MP 96950 Division of Historic Preservation, Department of Community and Cultural Affairs, Caller Box 10007, Airport Road, Saipan, MP 96950

Coastal Resources Management, P.O. Box 10007, Second Floor Morgen Bldg., San Jose, Saipan, MP 96950.

#### **Summary:**

Site Visit – 20 July 2004 James Pennaz, USACE and Ryan Yamauchi, EI

09:00 Met with CRM at CRM Office Conference Room Attendees: Mr. Jack Salas, CRM; Mr. Benny Pangelinan, CRM; Mr. Michael Tenorio, Equitable Realty

Discussion of Mr. Tenario's property (China House Detention Basin Site):

- Mr. Tenario is currently working with DPW to get a permit for the development of a driving range on the property.
- Mr. Tenario is willing to grant a 10-foot drainage easement along the southern and western boundaries to allow for transport of storm water.
- A small detention basin has been already been constructed in the northwestern corner of the property. Mr. Tenario is willing to allow continued use of this corner as a detention basin and may be able to get two additional adjacent family parcels for use as a detention basin.
- Drainage from the detention basin is the existing natural drainage way.

#### Discussion of Design:

- Mr. Yamauchi discussed complexities with CRM regarding the lack of a master plan for the storm drainage system and potential creation of new flooding areas should the transport system be altered. Mr. Salas suggested that we discuss this with DEQ.
- CRM wants EI to identify which of the parcels are required for the three different areas identified. CRM would like to start the process of property acquisition soon, so that further developments are not planned within the parcels required.

#### 10:00 - 12:00

Escorted by Benny to the China House site. Walked the site to observe the construction on Mr. Tenario's property. Observed that the downstream drainage way was overtopped during the last heavy rainfall event.

Escorted by Benny to the Arena site. Observed that the majority of the excavated quarry area has been filled. Drove the area upgradient from the Arena site. Observed that a few unpaved roads were washed out/damaged due to last heavy rainfall event. Drainage in this area is overland flow in a number of directions. There are no distinct drainage features.

#### 13:30 Met with Brian Bearden, DEQ.

Brian mentioned that DPW was starting on a drainage master plan for the study area, but this may be a few years away from completion.

The drainage standards/manuals will be adopted sometime next year.

The western side of the island will be considered Section 303 impaired, thus requiring establishment of TMDLs.

Brian understands the complexities of not having an existing drainage system and master plan for study area. Brian suggested that we try to design basins that best fit based on the constraints given to us.

14:30

Escorted by Benny to the Quartermaster site. Observed that the grade difference between Middle Road and the underlying parcels would allow for development of a detention basin.

Based on the discussions with CRM and DEQ, Jim and Ryan discussed the options and decided that the design should incorporate the design of the detention basins only, since the intent of this project is to affect water quality in the lagoon rather than flood control. This may be accomplished a number of ways. One suggestion from Jim would be to put a low flow pipe to the detention pond, which would capture the first flush flows with larger flows overflowing to the existing natural drainage ways. This would allow for treatment without causing new and different flooding areas. An evaluation of the portion of treatment expected/achievable for the different storm events (i.e. 1-yr, 2-yr, 10-yr) will be conducted (see attached sketch). Costs and benefits will also be considered.

The lots for each of the sites were generally evaluated to determine the optimum placement of the detention basins. Selected lots were identified during the site visit (see attached sketch).

#### Summary of Visit to Saipan from 10/24/11 to 10/28/11.

The project team arrived in Saipan on 10/23/11.

10/24/11: Meeting at the Commonwealth of the Northern Mariana Islands (CNMI) Coastal Resources Management (CRM) office.

#### Attendees:

CNMI CRM: Rose Pangelinan, Ana C. Agulto, Rita Chang, Rachel Zuercher

CNMI Department of Public Works (DPW): Oscar Pangelinan

CNMI Department of Environmental Quality (DEQ): Ryan Okano, Clarissa T. Bearden

National Oceanic and Atmospheric Administration (NOAA): Dana Okano

CNMI Department of Public Lands (DPL): Patricia Seman Rasa

CNMI OMB: Virginia Villagomez

United States Army Corps of Engineers (USACE): Milton Yoshimoto, Kevin Nishimura

Community Planning and Engineering (CPE): Anson Murayama, Frank Camacho

Environet: Sonia Shjegstad, Miya Akiba, Max Solmssen

#### 13:40- meeting began

USACE presented the project history to the group, as well as plans for the project moving forward. The project lost funding prior to the completion of the draft Environmental Assessment (EA)/Environmental Restoration Report (ERR) in 2007. The project has received funding again and has restarted. USACE is anticipated to fund the completion of the EA/ERR, as well as the design of the detention/retention basins. The USACE may be able to fund 65 percent of construction costs, but the CNMI will be responsible for the remainder of construction costs, along with the ongoing operation and maintenance of the detention/retention basins.

Environet gave a power point presentation detailing the project location, history and plans for moving forward.

NOAA asked how the project area was determined since there were runoff issues affecting the lagoon from locations outside the project area.

USACE responded that there were limited public lands available for the project, and that the best available sites were chosen given these land use restraints.

Environet then discussed data needs in preparing the EA/ERR with several members of the attendees, and informal meetings to exchange data later in the week were established.

USACE advised that funding for the construction of the project from USACE is limited, but it may be possible for the CNMI to secure federal funds from outside the USACE to finance their portion of the project costs.

CPE identified the following top three local cooperator responsibilities identified in the presentation as the primary project goals that would help to avoid runoff within the project site conjunction with the construction of the detention/retention basins:

- 1. Pave or armor unpaved roads that contribute majority of sediment to lagoon
- 2. Conduct sanitary sewer surveys and repair damaged portions of sewer system
- 3. Extend sewer lines to replace septic and cesspool systems in watershed

CNMI DPW stated that the implementation of the project should be coordinated with the CNMI Commonwealth Utilities Corporation (CUC).

CRM agreed to coordinate a meeting with CPE, USACE and the CUC on Wednesday, October 26, 2011.

15:00- meeting adjourned.

10/25/2011: Meeting at CNMI Legislator

#### Attendees:

CNMI Legislature: Representative Joseph M. Palacios, Chairman;

Speaker Eliceo D. Cabrera;

Floor Leader George N. Camacho;

Representative Ramon A. Tebuteb, SNILD Chair Representative;

Stanley T. McGinnis Torres, PUTC Chair Representative;

Ramon S. Basa, Ways & Means Chair Representative;

Rafael S. Demapan, JGO Chair;

Representative Fredrick P. Deleon Guerrero, FFA Chair;

Representative Joseph P. Deleon Guerrero, Minority Leader; and

Representative Antonio P. Sablan.

USACE: Milton Yoshimoto, Kevin Nishimura

CNMI CRM: Rachael Zuercher

CPE: Anson Murayama, Frank Camacho

Environet: Sonia Shjegstad, Miya Akiba, Max Solmssen

#### 10:00-Meeting began.

Chairman Palacios welcomed committee members and presenters, and formal introductions were made.

Chairman Palacios called on USACE to conduct the presentation on the Saipan Lagoon Aquatic Ecosystem Restoration Project.

USACE gave a brief project history.

Environet and USACE gave power point presentation detailing project history and planned schedule for current project. USACE outlined the proposed cost sharing for the project budget, and stated that USACE funds are limited to support the design phase of the project, and possibly portions of the construction phase. The CNMI would be responsible for securing funds for a portion of the construction costs, as well as all of the costs associated with ongoing operation and maintenance of the retention/detention basins.

Floor Leader Camacho asked if USACE was planning to address runoff in the Garapan area.

USACE responded that the current project area does not include the Garapan runoff areas. Chairman Palacios voiced concern for investigating possibly contaminated soil areas on Saipan.

USACE responded that the USACE environmental division should be contacted and may be able to help.

11:00: meeting was adjourned.

#### Saipan Lagoon Restoration Project Status Report: October, 2011

10/25/2011: meeting at CNMI DPW

#### Attendees:

CNMI DPW: Martin Sablan, Sonya Dancoe, Tony Camacho

CNMI CRM: Rachael Zuercher

USACE: Milton Yoshimoto, Kevin Nishimura CPE: Anson Murayama, Frank Camacho

Environet: Sonia Shjegstad, Miya Akiba, Max Solmssen

13:30-Meeting began

#### Introductions

USACE delivered brief project background.

Environet and USACE gave power point presentation detailing project history and planned schedule for current project. USACE outlined the proposed cost sharing for the project budget, and stated that USACE funds are limited to support the design phase of the project, and possibly portions of the construction phase. The CNMI would be responsible for securing funds for a portion of the construction costs, as well as all of the costs associated with ongoing operation and maintenance of the retention/detention basins.

CNMI DPW informed USACE of the CNMI Hazard Reduction Project that is planned to include repaving and striping of Beach Road. CNMI DPW stated that identifying lands for the proposed project will be a challenge.

CPE and CNMI DPW agreed to share information and stay in close communication regarding the planning and implementation of both the proposed detention/retention basins, and the CNMI DPW hazard reduction project.

CNMI DPW stated that the operation and maintenance of the detention/retention basins may be a problem due to lack of funding.

CPE stated that they will work to incorporate specifications in the design of the basins to allow for less maintenance. However, the design must also adhere to current CNMI DEQ standards.

CNMI DPW provided CPE with the scope of work for a portion of the Hazard Reduction Project, and stated that there may be opportunities for partial funding of the detention/retention basin project as a capital improvement project.

CNMI DPW and CPE discussed different design options that would work. CNMI DPW suggested detention basin at American Memorial Park as a good example of an acceptable "wet pond" that adheres to CNMI DEQ standards.

14:40-Meeting adjourned.

#### 10/26/2011

9:30-Environet and CNMI CRM met with Marine Biologist Mr. Peter Hauk of the Pacific Marine Resources Institute to obtain data for the project.

10:15- Environet and CNMI CRM met with Michael C. Tenorio from CNMI Division of Fish & Wildlife Fisheries Research Section to gather data.

10:30- Environet and CNMI CRM met with Lee Perlow from CNMI Department of Lands and Natural Resources, Division of Fish and Wildlife to consult regarding the presence of important biological species at the proposed retention/detention basin sites.

11:00-11:30- Environet, CPE and CRM conducted site visits to the Arena Site, China House Site and Quartermaster Site.

14:00- Meeting at Legislator

Attendees:

CNMI Governor: Mr. Benigno Repeki Fitial

CNMI CRM: Rachael Zuercher

USACE: Milton Yoshimoto, Kevin Nishimura CPE: Anson Murayama, Frank Camacho Environet: Miya Akiba, Max Solmssen

#### 14:30-Meeting began

Introductions

Environet and USACE gave power point presentation detailing project history and planned schedule for current project. USACE outlined the proposed cost sharing for the project budget, and stated that USACE funds are limited to support the design phase of the project, and possibly portions of the construction phase. The CNMI would be responsible for securing funds for a portion of the construction costs, as well as all of the costs associated with ongoing operation and maintenance of the retention/detention basins.

Governor Fitial made inquiries regarding budget, and concerns about sedimentation in the lagoon. He stated that land acquisition of private lands for a public purpose is allowed under CNMI laws.

15:30-Meeting adjourned.

#### 10/27/2011

- 8:30: Environet met with CNMI CRM to obtain additional data needs.
- 9:15: Environet met with Clarissa T. Bearden from CNMI DEQ to obtain water quality data needs. Environet contacted CNMI Historical Preservation Office (HPO) to begin the Section 106 consultation process.

10:00-14:00: Environet conducted site visits to previously identified potentially contaminating activities (PCAs) within the project area, as well as searched for any new PCAs within the project area.

#### 10/28/2011

8:30-11:30: Environet continued search of the project area for existing and new PCAs End of Trip Report.

Appendix B
Phase I Report, Saipan Lagoon Aquatic Ecosystem Restoration Study

## FINAL

# PHASE 1 SAIPAN LAGOON AQUATIC ECOSYSTEM RESTORATION PROJECT



Report Prepared for:



U.S. Army Corps of Engineers, Honolulu Engineer District Fort Shafter, HI 96858-5440

June 2001



# United States Army Corps of Engineers Honolulu Engineering District Environmental Engineering

# Phase 1 Aquatic Ecosystem Restoration Study at Saipan Lagoon Saipan, Commonwealth of Northern Marianas Islands

Prepared for: U.S. Army Corps of Engineer, Honolulu Engineering District

Prepared by: Environet inc., Honolulu, Hawaii

Contract No. DACA83-00-D-0037 Delivery Order 02 June 2001

# **TABLE OF CONTENTS**

EXECUTIVE	SUMMARY		iv
SECTION 1	INTRODUC	TION	1
	1.1 Goals	and Objectives of the Phase 1 Restoration Study	1
	1.2 Know	ledgeable People Interviewed	2
	1.3 Local	Environmental Concerns	2
	1.4 Regul	atory Framework	3
SECTION 2	SITE DESCRIPTION AND BACKGROUND		5
	2.1 Site I	ocation	5
	2.2 Site I	Description	5
	2.2.1	Climate	6
	2.2.2	Physiography and Soil	
	2.2.3	Soil Erosion	7
	2.2.4	Regional Geology and Hydrogeology	
	2.2.5	Watershed Delineation	8
	2.2.6	Coral Reef and Lagoon Habitat	
		listory	
		Use in Area	
		tial Contaminating Activities within Watershed	
		nfrastructures (Storm Drains and Sewers)	
	2.7 Socio	economic Considerations	13
SECTION 3	PREVIOUS	INVESTIGATIONS IN PROJECT AREA	14
		ous Environmental Investigations	
	3.2 Previo	ous Physical Oceanographic Studies	15
		ous Water Quality Studies	
	3.4 Previo	ous Flood and Runoff Studies	16
		ous Marine Biological Surveys in Lagoon Area	
	3.6 Identi	fication of Data Gaps for Project Area	18
SECTION 4	ADDITIONA	L STUDIES RECOMMENDED FOR PROJECT AREA	20
	4.1 Storm	water Quality Investigation	20
	4.2 Analy	ze Lagoon Sediments for Physical and Chemical Parameters	20
	4.3 Marin	e Habitat Mapping from Historical and Current Aerial Photographs.	21
		re Lagoon Area Sea Grass and Associated Fauna Survey	
	4.5 Inven	tory of Potentially Contaminating Activities in Watershed	22

# **TABLE OF CONTENTS**

	5.2 5.3	Infrastructure Improvements  Watershed Management	28
	5.2	Infrastructure Improvements	28
	J.1		26
	5.1	Regulatory Changes	
SECTION 5	PRELIMINARY POTENTIAL RESTORATION ALTERNATIVES		
	4.11	Ranking of Proposed Additional Investigation	25
	4.10	Residence Time Study of Lagoon Water	24
	4.9	Sanitary Sewer Overflow Assessment of Project Area Collection System	s23
	4.8	Lagoon Water Quality Investigation	23
	4.7	Groundwater Level Investigation in Watershed	23
	4.6	Hydrologic Study of Runoff Processes in Watershed	22
		TIJ1	

# **TABLE OF CONTENTS**

#### **LIST OF FIGURES**

Figure 1: General Site Location Map Figure 2: Soil Types Within Watershed Geologic Map of Saipan Figure 3: Figure 4: Watershed Boundary Map Figure 5: Marine Habitats in Lagoon Measured Decline in Fish Take from Saipan Lagoon Figure 6: Figure 7: Location of Storm Drains Figure 8: Sewer System Layout Figure 9: Proposed Offshore Sediment Sampling Sites

Figure 10: Well Locations

Figure 11: DEQ Water Quality Monitoring Locations

## LIST OF TABLES

Table 1: List of Knowledgeable People Interviewed

Table 2: Water Quality Measured in Wells Located Within Project Watershed

Table 3: Estimated Importance, Cost and Duration of Recommended Studies

# **EXECUTIVE SUMMARY**

A Phase I Aquatic Ecosystem Restoration (AER) Study was prepared for a 1.5-mile length of shoreline located in western Saipan, Commonwealth of Northern Marianas Islands (CNMI). The project site extends from Quartermaster Road to the Fishing Base and encompasses the entire inland watershed that contributes groundwater and surface water runoff to this 1.5-mile length of shoreline as well as the adjacent offshore lagoon area out to the fringing coral reef.

This report provides preliminary restoration alternatives as well as suggestions for additional studies required to establish baseline environmental conditions within the study area. The restoration alternatives discussed include regulatory approaches, improved watershed management, and undertaking infrastructure improvements to reduce the amount of sediments and contaminants that discharge into the ocean.

The baseline data that would be collected in the studies recommended in this report would be used to monitor the progress of future environmental restoration efforts conducted in the area. It is believed that implementation of the recommended remedial measures will lead to an increase in nearshore fish population (as a result of habitat improvement) and a reduction in the frequency of closures of beach recreational areas due to microbiological contamination.

A December 2000 draft Phase 1 AER report was reviewed by representatives from the U.S. Army Corps of Engineers, and employees of the CNMI Departments of Public Works, Coastal Resources Management and Environmental Quality. A total of ten studies were initially recommended in the draft report. The decision was made at a meeting held in Saipan in early March 2001 to focus on the following seven studies during the Phase II portion of this study:

- 1) Stormwater Quality Investigation
- 2) Analyze Lagoon Sediments for Physical and Chemical Parameters
- 3) Marine Habitat Mapping from Historical and Current Aerial Photographs
- 4) Inshore Lagoon Area Seagrass and Associated Fauna Survey
- 5) Inventory of Potentially Contaminating Activities in Watershed
- 6) Hydrologic Study of Runoff Processes in Watershed
- 7) Lagoon Water Quality Investigation

The CNMI Department of Environmental Quality has agreed to assist the U.S. Army Corps of Engineers and their contractors with the offshore monitoring and sample collection portions of these studies.

This report presents the results of the Phase I portion of the Section 206 Aquatic Ecosystem Restoration Study for a 1.5-mile length of shoreline in western Saipan, Commonwealth of Northern Marianas Islands (CNMI) (Figure 1). The overall project objective is to develop restoration actions that would provide a cost-effective means of restoring the degraded nearshore lagoon environment in this area.

The study described in this report was performed for the U.S. Army Corps of Engineers, Honolulu Engineer District (USACE-HED). The project was conducted by Environet Incorporated (EI) under U.S. Army Corps of Engineers contract number DACA83-00-D-0037, Delivery Order No. 0002. Oceanit Incorporated (OI) was subcontracted by EI to conduct a preliminary assessment of the offshore environment within the project area.

#### 1.1 GOALS AND OBJECTIVES OF THE PHASE 1 RESTORATION STUDY

The purpose of this Phase 1 portion of the Aquatic Ecosystem Restoration Study is to: 1) review existing data and identify gaps in the existing scientific data that need to be addressed to establish baseline conditions in the nearshore lagoon environment; and 2) identify potential restoration alternatives for a 1.5-mile stretch of shoreline located between Quartermaster Road and the Fishing Base on the west side of Saipan.

The restoration of tropical marine habitats requires several components to be successful including:

- The natural state of the habitat needs to be known and described;
- Key indicator species that can be monitored during proposed remedial activities need to be identified;
- The proposed remedial method must be cost effective; and
- The effectiveness of the remedial method must be measurable in terms of how well the affected habitat converges in form or function with natural intact habitat.

The scope of work followed the work items described in a cost proposal letter dated September 26, 2000 from EI to Mr. Kent Tamai, the Contracting Officer for the USACE-HED. The following tasks were conducted during this study:

- A reconnaissance survey of the project site was conducted during a week-long field visit to Saipan. Interviews were conducted with local residents and regulatory personnel who possessed pertinent information for the lagoon and contributory watershed.
- Provided a general description of the project area (Section 2.0).
- Reviewed water quality and environmental data available for the Saipan lagoon and the watershed that contribute groundwater, storm water runoff, and sediment to the project shoreline (Section 3.0).

- Evaluated the existing scientific information available for the lagoon and identified gaps in the existing scientific database (Section 3.6).
- Recommended additional studies required to obtain the missing data identified during the literature search and interviews with knowledgeable individuals (Section 4.0).
- Identified Preliminary Potential Restoration Alternatives for mitigating the current environmental degradation occurring within the Saipan lagoon (Section 5.0).

#### 1.2 KNOWLEDGEABLE PEOPLE INTERVIEWED

A number of people who work for various Federal and Local government agencies were interviewed between October 23 and October 28, 2000 in Saipan. Table 1 contains the names and phone numbers of the people contacted during the site visit to Saipan. The concerns expressed by the individuals interviewed are summarized in Section 1.3.

#### 1.3 LOCAL ENVIRONMENTAL CONCERNS

There is great concern over any threat to the natural ecology of the reef lagoon system because a large percentage of Saipan's economy is based upon foreign tourist who are attracted to the island by the spectacular reefs and marine life surrounding the island. Local fishermen who depend upon the reef for subsistence as well as recreational and commercial fishing interests are similarly concerned about the perceived degradation to the nearshore reef system. The following concerns were expressed about the health of the lagoon environment by individuals during the field reconnaissance:

- Sea grass beds are deteriorated in the vicinity of stormwater outlets to the lagoon.
- The nearshore environment is perceived to support a greater abundance of fast growing algae species (Enteromorpha and Hypnea) than previously noted, and this could point to increased nutrient influx into the lagoon.
- The previously white sand beach along Garapan is now tinged with the browns and grays of terrestrial sediments.
- Once plentiful lagoon fisheries are now perceived to be a dwindling resource.
- Lagoon waters that used to be clear in all but the heaviest rainfalls, are now typically discolored brown after every rainfall.
- Sediments from upslope erosion are forming deltas of brown sediments into the lagoon.
- Deterioration in the function of the sea grass beds could allow pollutants to reach and impact the outer coral reef ecosystem.

#### 1.4 REGULATORY FRAMEWORK

Section 206 of the Water Resources Development Act (WRDA) of 1996 provides authority for the United States Army Corps of Engineers (USACE) to undertake restoration projects in aquatic ecosystems such as rivers, lakes, and wetlands. The USACE evaluates projects that benefit the environment by restoring, improving, or protecting aquatic habitat for plants, fish and wildlife. The USACE initially conducts a preliminary study to determine if there is a Federal interest in assisting in resolving the problem. A feasibility study is then conducted to define the problem, identify potential solutions, analyze the costs, benefits, and environmental impacts of the alternatives and select a plan. This project is being conducted under the auspices of this program.

The CNMI has promulgated a number of regulations over the past 15 years to protect the environment. The basic environmental rights can be found in the CNMI constitution that states in Article I, Section 9, that each person has the right to a clean and healthful public environment. The Division of Environmental Quality (DEQ) was formed "to develop and administer programs, including, where appropriate, a system of standards, permits, or prohibitions, to prevent or regulate activities concerning the discharge of pollutants to the air, land, water, wetlands, and submerged lands." DEQ has regulations governing earthmoving activities. The purpose of the earthmoving permits is to prevent soil erosion and to minimize pollution of marine, surface or groundwater resources. Although the National Pollutant Discharge Elimination System (NPDES) program has not been delegated to the CNMI, DEQ issues Section 401 Water Quality Certifications to any project that may affect water quality. Section 401 Water Quality Certifications are issued for all projects involving discharges, dredging, or any activity in wetlands. This CNMI permitting process is closely linked to the USACE Section 404 permitting program.

The Clean Water Act (CWA) requires that individual States designate water quality limited segments within their jurisdiction and address water quality concerns within these areas in part through the implementation of Total Maximum Daily Load (TMDL) studies. These TMDL studies attempt to quantify the individual components that contribute suspended and dissolved phase constituents to the nearshore environment. The TMDL studies are a required component of future upgrades to Water Quality Management Plans developed for regulated waters within individual States.

DEQ (1999) has recently completed a Section 305(b) Water Quality Assessment Report for the Commonwealth of the Northern Mariana Islands. This report was written following guidance detailed in Section 305(b) of the CWA and allowed determination of the following issues: (1) whether U.S. waters meet water quality standards, (2) the progress made in maintaining and restoring water quality, and (3) the extent of remaining problems in the CNMI. Onshore, the Safe Drinking Water program began implementing the VOC monitoring requirement, as outlined in the CNMI Drinking Water Regulations in January 2000. Public water systems within the CNMI will be required to do VOC testing in order come into compliance with these regulations. DEQ plans on updating the CNMI's Water Quality Standards at the end of the year 2000.

The Coastal Resources Management (CRM) Program was developed to manage all activities within areas designated as Areas of Particular Concern (APC), including the shoreline to 150 feet inland, lagoon and reefs, wetlands and industrial areas surrounding seaports. The Coastal Resources Management Act is outlined in CNMI Public Law 3-47. This act was established to coordinate island development management and specifies policies and rules that regulate activities that have the potential to affect the island's resources. These resources were broadly defined and included marine water and resources, groundwater, wetlands, watersheds and certain designated APC's. Prior to the initiation of any large development in the CNMI, the developer must obtain a CRM major siting permit. The CRM permitting process provides all of the appropriate government agencies an opportunity to inform the developer the various permitting requirements and general areas of concern for the proposed project. CRM also has an active monitoring and enforcement section.

Soil and Water Conservation Districts were created on Saipan by Public Law 4-44 which outlines methods for conserving, developing and using the soil and water resources on the island to control and to prevent erosion and flooding and to improve agricultural water management.

The CNMI has designated two classes of water (AA and A) for marine uses. The CNMI Water Quality Standards define these classes of water as follows: "The CNMI has designated two classes of marine waters: A and AA. Class AA represents high-quality waters that are considered to be in a "natural" and "pristine" state. The CNMI Water Quality Standards states that "to the extent practicable, the wilderness character of such areas shall be protected," and does not permit any discharge of pollutants in class AA waters. Class A waters have been designated in two parts of Saipan, and generally represent a slightly lower quality of water in which some discharges may be permitted, for example, the two sewage treatment plant outfalls on Saipan. Nevertheless, Class A waters must support recreational use and the propagation of fish, shellfish, and wildlife, and strict water quality standards have been set for the protection of these uses in Class A marine waters. Additionally, further protection is afforded through the CNMI Anti-Degradation Policy, which is part of the Water Quality Standards and protects existing uses and water quality in any waters, despite their classification."

Almost all of the coastal marine waters on Saipan are designated as Class AA, including the project site. These waters should remain in their natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality from any human-related source or actions. The uses protected in these waters are the support and propagation of shellfish and other marine life, as well as the conservation of coral reefs and wilderness areas, oceanographic research, and aesthetic enjoyment and compatible recreation inclusive of whole body contact (e.g. swimming and snorkeling) and related activities. The lagoon area within the project site is designated as Class AA waters.

## 2.1 SITE LOCATION

The project site extends from Quartermaster Road to the Fishing Base along the western shoreline of the island of Saipan, CNMI (Figure 1). The project area encompasses the entire inland watershed that contributes groundwater and surface water runoff to this 1.5-mile length of shoreline as well as the adjacent offshore lagoon area out to the fringing coral reef. The general coordinates of the project site extend from 15° 11' to 15° 12' north latitude and 145° 42' 31" to 145° 42' 32" east longitude.

#### 2.2 SITE DESCRIPTION

The shoreline in the project area consists of a narrow sand beach. The beach consists mainly of loose limesand with some gravel, shell, and coral rubble, over calcareous gravel and beach rock. These sediments are primarily medium-to course-grained and well sorted. The beach is topped at the high water mark by a strip of grasses, vines, and trees, followed by a concrete pedestrian path further inland. The 2.8-mile long concrete pedestrian walking path that meanders between the narrow sandy shoreline and Beach Road. Picnic facilities, numerous trees, vehicle turnout areas, a memorial to fishermen lost at sea (13 Fishermen Monument), a Japanese tank monument, and concrete defensive bunkers built by the Japanese during the war are also found along this section of shoreline. The northern boundary of the site contains an earthen pier that was built during the Japanese period on the island. A dilapidated barge that was formerly used as a restaurant rests firmly aground just to the south of this earthen pier. The southern boundary of the site is opposite Quartermaster Road. The area to the east of Beach Road contains numerous businesses built on private land, including restaurants, hardware and stationary stores, a car lot and several strip malls.

Beach Road is a two lane undivided, signaled asphalt highway that was improved by the US Military following WWII, but not completely paved along its length until about 1985. Middle Road runs parallel to and about half-mile inland of Beach Road, and was improved to a paved, four-lane undivided and signaled asphalt highway in about 1990. Two paved roads link these two highways, Island Power Road to the North and Quartermaster Road at the Southern boundary of the project area. A number of coral gravel surface roads leading to small commercial and residential buildings are present within the project area. The slope of the land becomes steeper above Middle road and the watershed is broken into a series of irregular hills and valleys containing intermittent streams.

The coastal areas are vegetated with ironwood (Casuarina equisetifolia), sea hibiscus (Hibiscus tiliaceus) and a number of ornamental trees with an understory dominated by grasses and seaside morning glory (Ipomoea pescaprae). The inland portions of the project site are either paved or overgrown by scrub vegetation dominated by tangantangan (Leucaena leucocephala), ivy gourd (Coccinia grandis), and occasional ironwood and coconut trees.

#### 2.2.1 Climate

The climate in Saipan is warm and humid throughout the year and is classified as tropical marine, with an average temperature of between 75 to 80 degrees Fahrenheit (Van der Brug, 1985). Rainfall in the study area is seasonal and averages about 75 to 80 inches/year. The wet season usually extends from July through November, followed by a dry season from December through June. Saipan experienced drought-like conditions during 1998, when the rainfall between January and November totaled roughly 41 inches, or roughly half the annual mean.

The dominant winds in the Northern Marianas are tradewinds, which blow from the east or northeast. These winds are strongest and most constant during the dry season, when wind speeds of 15 to 25 miles per hour are common. During the rainy season, the tradewinds often cease, and on some days the weather may be dominated by westerly moving storm systems that bring heavy showers or steady, at times torrential, rains. These episodic, heavy rainfall events contribute the majority of the sediment and surface water runoff that reaches the nearshore lagoon environment. Some of these heavy rainfall events occur during typhoons.

#### 2.2.2 Physiography and Soil

The project site is situated in the western central part of the island of Saipan. The site potentially receives runoff and sediments from the southern half of the West Takpochao watershed, which extends roughly 2 miles inland to the limestone ridge that peaks at 1,540 feet above mean sea level on the summit of Mount Takpochao. The area between the shoreline and Middle road is a slightly to moderately sloping coastal plain composed of unconsolidated limestone derived sediments. The area inland of Middle road possesses the characteristic geomorphology on the island of Saipan with slightly to moderately sloping topographic plateaus separated by seaward-facing scarps of emergent limestone.

The characteristics of the surface soils generally vary in moving inland from the shoreline to upland areas of the watershed (Figure 2). The lowland areas that extend from the shoreline to just inland of Middle road are dominated by soils of the Chinen-Urban Land Map Unit (Young, 1989). These soils are highly porous and account for the lack of natural streambeds or continuous drainage ways across the lowland areas. During the Japanese and German occupations of these islands, much of these lands were in intensive agricultural use. The areas upland of Middle Road in the vicinity of Gualo Rai are covered by soils of the Kagman-Saipan Map Unit while further inland the land area is dominated by the Takpochao-Chinen-Rock Outcrop Map Unit. The Chinen-Urban Land Map unit in the lowlands between Middle road and the Beach Road is the most soil unit most prone to erosion in the area. However, the largest percentage of the sedimentation that occurs along the Beach road drainages appears to come from quarried limestone backfill used for road and lot surfacing, rather than from erosion of the underlying native and disturbed soils.

#### 2.2.3 Soil Erosion

Sediment transport to lowland areas occurs naturally in all island systems. In the project area, the amount of sediments being transported to the lagoon environment has increased in conjunction with the spreading urbanization of the lowland areas within the watershed. The increased number of roofs, roads, and other paved areas impervious to rain increases the amount of runoff and tends to channel the runoff between properties. Construction activities and clearing of the natural vegetation tend to disturb the natural soils rendering them more susceptible to sheet and rill erosion. A decline in coverage by natural vegetation due to increased urbanization also limits the ability of the substrate to hold rainfall and makes these remaining lands more subject to runoff and erosion. The resulting increased levels of runoff and sedimentation to the lagoon overloads the ability of the natural seagrass community to cope with these pollutants and can damage coral reefs and associated ecosystems. Damage to coral reef ecosystems can result from direct sedimentation onto coral polyps or from increased nutrient concentrations that may lead to overgrowth by algae species. A shift in reef species towards more nutrient tolerant and less diverse communities will also lead to changes in the fish populations inhabiting the reef. In addition, less diverse communities of coral are more susceptible to damage during natural disasters such as typhoons. The most serious consequence however, is that any perceived decrease in the quality of the coral reef ecosystem is likely to have a negative impact on tourism on Saipan.

The Soil Conservation Service estimated erosion rates for Saipan soils present in the Kagman Watershed on the eastern side of the island. The average erosion rate from the forested upper watershed is estimated to be about three tons per acre per year while areas under construction may exceed rates of 20 tons per acre per year. The developed homestead area in Kagman, which is situated on a relatively flat limestone plateau, yields between two to five tons of soil per acre per year. Erosion rates for the soils present within the project watershed are not available. However, initial observations made during the reconnaissance field visit of eroded gravel roads, obvious sedimentation in storm drain gullies, and occasional lapses in implementation of Best Management Practice (BMP) regulations at construction sites suggest that erosion rates may be high.

# 2.2.4 Regional Geology and Hydrogeology

The island of Saipan is composed of a volcanic core upon which a series of discrete limestone formations have been deposited by coral reefs when these sections of the island were below sea level. Roughly, 90 percent of the surface of the island is currently mantled with limestone, with the remaining areas chiefly comprised of volcanic outcrops and unconsolidated beach or marsh deposits (Figure 3). The aerial distribution of rock type on the island has been created by successive episodes of tectonic uplift resulting from the flexure of the outer edge of the Philippine Plate in response to subduction of the Pacific Plate to the east of Saipan along the Marianas trench (Karig, 1971). The thick fringing limestone units, which are exposed at elevations of up to 1,540 feet above mean sea

level on the summit of Mount Tagpocahu, have become sub-aerially exposed as a result of these tectonic processes.

The western half of the island, where the site investigation was conducted, is bordered by a large barrier reef and lagoon. Cloud et al. (1956) show the Garapan coastal plain to be underlain by recently emerged lime sands that overlie competent limestone reef at varying depths. Groundwater in the western coastal portions of Saipan occurs as an unconfined brackish water lens that overlies saltwater. The regional aquifer at the subject site is made up of the coral and coral-derived material of the Marianas Formation and the overlying lime sands. Due to the relatively high permeability of these units, the water levels within this aquifer fluctuate with ocean tides. Historically, limited amounts of generally brackish water have been exploited by wells dug along the coastal plain into this unit. Water quality measurements made on a number of wells located within the project watershed are compiled in Table 2. This data shows that the majority of the wells produce very brackish water with somewhat elevated concentrations of nitrate.

#### 2.2.5 Watershed Delineation

The Coastal Resources Management Commission has delineated eleven major watersheds on the island of Saipan. The project site is located within the West Takpochao watershed (Figure 4). This watershed extends along the shoreline from about 500 feet south of Quartermaster Road to the area just north of Charlie Dock at Tanapag Harbor. The watershed extends inland to the ridgeline that runs up to Mount Takpochao and continues on through the Capitol Hill area.

#### 2.2.6 Coral Reef and Lagoon Habitat

Amesbury et al (1979) described 24 habitats in Saipan Lagoon of which eleven are present fronting the project site. These habitat types are expressed and expanded upon in the Saipan Lagoon Use Management Plan (Duenas and Swavely, 1995). This document divides the lagoon into several planning areas of which Planning Area 5 ("from the small cove opposite the fisheries complex in Garapan south to San Jose Beach") encompasses the project area. Habitats in the project are delineated in Figure 5 and include the following:

- Inshore Seagrass Beds and Patches
  - o Habitat 2. Seagrass (Enhalus) in sand, to 0.3m deep
  - o Habitat 3. Seagrass (Halodule) in sand, to 0.6 m deep
- Mid-Lagoon Sandy Areas
  - o Habitat 4. Seagrass (Halodule) and algae in sand and dead coral, to 1 m deep
  - o Habitat 5. Sand, coral rubble and small live corals with algae (Dictyota, Goodlea, Homothanmion), to 1 m deep
  - o Habitat 6. Sand with "Sargassum", to 1 m deep

- o Habitat 7. Sand and coral rubble with Laurencia, to 1.6 m deep
- o Habitat 11. Sand and blue-green algae, to 7 m deep
- o Habitat 14. Dead coral patches in sand with Halimeda and Dictyota, to 2 m deep
- o Habitat 15. Sand with live beds of staghorn corals, to 3 m deep

#### • Lagoon Barrier Reef Flat

- o Habitat 21. Submerged barrier reef with large live coral
- o Habitat 22. Submerged barrier reef with large live coral and algae (Bryopsis, Halimeda, Avrainvillea) to 4 m deep

The focus of this project is the inshore habitat since it receives the majority of the fresh water pollution and serves as the first line of defense for the valuable coral reef and fisheries resources further offshore. This area is described in greater detail below.

The inshore zone is generally comprised of a sand and sand/silt/rubble substrate covered by thick stands of seagrass and algae with only an occasional coral head or limestone outcropping. Because of the heavy input of fresh water (runoff and groundwater) into this environment, dense beds of the large bladed tall (up to 3 feet) seagrass Enhalus acoroides are found in a 10 to 50 meter wide band along the shoreline. Freshwater and entrained nutrients are known to enhance the growth of this sea grass but would have a negative impact on any corals in the area. Intermixed between stands of the Enhalus and extended further out into the lagoon, often to the reef, is the very common short sea grass Halodule uninervis which may cover 20 to 70% of the benthic substrate in the lagoon outside the Enhalus beds and inside the coral reef. Algae species are abundant (more so nearshore) including Halameda, Padina, Calurpa spp., Laurencia spp., Acanthophora and Dictyota as the most common Of concern, however, are the noted presence of two types of algae, Enteromorpha, and Cladophora with rapid growth potential that could bloom and become nuisance algae if nutrient levels become significantly elevated. The green, hair-like Enteromorpha was noted along the beach in several areas in the upper tidal area and appeared coincident with areas of fresh water infiltration. The pale hair-like algae Cladophora was noted in the inner lagoon area adjacent to the northern edge of the project area.

Corals in the inshore zone are very sparse and are characterized by scattered, small colonies of *Porites lutea* and *Pocillopora damicornis*. Live coral cover is less than one percent overall, but some areas may support colonies of Porites and Pocillopora at densities up to 5%. Invertebrates conspicuous in the inshore zone include the common sea cucumber genuses *Holothuria*, *Actinopyga*, and *Bohadschia*, the large starfish Linckia *laevigata*, and the clam known locally as "Amsum". Inshore fish resources include rabbitfish (Siganus), mullet (Mugilidae), goatfish (Mullidae), snappers (Lutjanidae), the emperor fish (Lethrinus harak), and silversides (Atherinidae). Juveniles of many species may be found in the sea grass beds and occasional predatory species such as groupers, jacks and barricuda may also be present. This resource is utilized by local fishermen for subsistence and sport. Fish are collected with small eye throw-nets, scoop nets, surround-nets, and spears.

Fishermen interviewed expressed the opinion that inshore fisheries resources were in decline, and information from the Division of Fish and Wildlife (DNR, 1998) would seem to support this contention (Figure 6).

#### 2.3 SITE HISTORY

The Mariana Islands were discovered in 1521 by Ferdinand Magellan and were claimed for Spain in 1565 by de Legaspi. By 1568, the Spaniards relocated all Chamorros living on the Northern Mariana Islands (including Saipan) to villages on Guam in order to suppress indigenous resistance to foreign rule. Carolinians from the outer islands of the Truk district were the first Micronesians to repopulate Saipan in 1815 as a result of being displaced from their home islands by a devastating typhoon. In 1899, Spain sold the Mariana Islands to the Germans who developed coconut plantations for copra production using local labor. In 1914, the Mariana Islands were seized by a Japanese naval fleet during the opening days of World War I. The League of Nations placed the islands under Japanese mandate in 1920. The Japanese actively colonized and cultivated the Mariana Islands during their tenure. For instance, roughly 32 percent of the land area on Saipan was planted with sugarcane by the 1930s. By 1937, a total of 42,000 Japanese were living on the Northern Mariana Islands. A narrow-gauge railway was built around much of Saipan in order to transport harvested sugarcane to the cane mill located in Chalan Kanoa. Garapan and the northern half of the project area served as the commercial center on the island during the Japanese tenure. The island was heavily fortified by the Japanese during World War II as a result of the island's strategic location in relation to the Japanese mainland.

During World War II, United States forces invaded Saipan on June 15, 1944, and successfully captured the island on July 9, 1944. The shoreline at the project site was heavily shelled during the invasion and numerous live and dud ordnance were encountered during construction of the beachpath. The military quickly embarked on numerous construction projects throughout Saipan that required improving the existing transportation system on the island. Beach road and the Garapan area infrastructure was upgraded by the Navy shortly after the war.

Saipan underwent tremendous growth in the 1980s with the growth of the island's tourist and garment industries. This is reflected in the tremendous growth in the islands population from roughly 15,000 in 1980 to over 72,000 in the year 2000.

#### 2.4 LAND USE IN AREA

The two major thoroughfares on Saipan, Beach and Middle Roads, run through the project area. The majority of urban development in the area is concentrated along these two roads. The community of Gualo Rai extends inland of Middle Road. The remainder of the watershed area inland of Middle Road is predominately covered by forest vegetation. The area between Beach and Middle roads

within the study area is currently only heavily developed in the immediate areas adjacent to these two roads. However, it is likely that the entire land area between these two roads will become heavily urbanized within the next decade due to this areas proximity to the island's commercial and governmental centers and the demands of a rapidly increasing population.

The urbanization of the inland watershed area that has occurred over the past twenty years has likely dramatically increased the amount of sediments and storm water runoff reaching the lagoon area. Prior to urban development of the area, the majority of sediment and stormwater runoff was trapped by the natural vegetation present along the coastal plain prior to reaching the lagoon. Increasing future urbanization of this area would likely increase the volume of both sediment and rainfall runoff reaching the lagoon.

#### 2.5 POTENTIAL CONTAMINATING ACTIVITIES WITHIN WATERSHED

The areas adjacent to Beach and Middle roads contain numerous commercial, residential and industrial facilities that are all potential sources of pollutants to surface and ground waters which impact the lagoon. Potential contaminating activities (PCAs) present in this area include gas stations, garment factories, automobile dealerships, septic systems associated with various residential and commercial properties, and sediment erosion associated with construction and unpaved road erosion. Additionally, the sewer collection system within the project area along Middle Road is known to overflow, and a major new collection system nearing completion along Beach Road will raise the potential for lagoon contamination from sanitary sewer overflows (SSOs).

# 2.6 SITE INFRASTRUCTURES (STORM DRAINS AND SEWERS)

At present, there are 13 storm drainage outlets within the study area that drain to the Saipan Lagoon (Figure 7). The drains were originally installed during construction of Beach Road in the early 1980s. Headwalls for the drain outlets were constructed when the beach walk (bike path) was built in the mid-1990's. A typical storm drain consists of a grated catch basin on the inland side of Beach Road, followed by 30-inch diameter reinforced concrete pipe(s) (RCP) that run beneath Beach Road and convey the storm water from the catch basin to the lagoon. In general, these storm drains collect stormwater from the immediate vicinity of Beach Road (i.e. runoff from Beach Road and properties adjacent to the road). The size of the drainage outlets vary from outlets with one 30" RCP to outlets with three 30" RCPs. The tributaries (areas) for these drains were not delineated during the site visit.

Middle Road parallels Beach Road about a half-mile inland and is similarly drained by a series of individual storm drains. The design of the drains is similar to that of Beach Road with catch basins on the inland side of the road and outlets on the other side of the road. The contributory flow from the upland areas of Middle Road were not delineated or quantitated during the site visit. The drains along Middle Road discharge to the properties between Beach Road and Middle Road. However,

there seems to be no connection between the storm drains on the upper road and those on the lower road. There does not appear to be any drainage easement through this area. Since the topography of the area is relatively flat, runoff tends to pond in the area during heavy rainfall. Depending on the severity of the rainfall event, flooding of the down-slope properties and roads may occur. It appears that only a small fraction of the runoff from properties inland of Middle Road reach the storm drains at Beach Road during normal intensity rainstorms, with the majority of the runoff infiltrating into the highly permeable limestone.

A visual survey of the drainage outlets along Beach Road was conducted. Sediment deposition was observed in the immediate area surrounding the outlets (see site photographs). The deltaic formations around the outlets extended up to 50 feet into the lagoon from these discharge points. The transported sediment consisted of fine sand with some silt and was significantly darker in color than adjacent beach sand.

At present, the homes and businesses within the study area limits are not sewered and use septic systems for disposal of wastewater. No records were available describing the number and location of septic systems in the area. Local regulatory officials suggested that some gray water disposal is discharged directly to the surface without benefit of a septic system or leach field. It is believed that septic system failures probably contribute a significant amount of nutrients to the nearshore waters within the project area.

The Commonwealth Utilities Commission (CUC) is presently constructing a gravity sewer system for the area. Figure 8 shows the general layout of the sewers as shown in the CUC Sewer Master Plan for the area. The main trunk line for the new sewer will run along Beach Road with a number of laterals connecting from the side streets and private properties. Due to topography, lift (pump) stations will be required at certain points in the conveyance system. The new sewer will connect into the existing system in Garapan with the ultimate destination of the wastewater being the Sadok Tasi Wastewater Treatment Plant (WWTP) to the north. PVC pipe will be used for the new sewers.

Sanitary sewer overflows (SSOs) have been reported for the existing wastewater collection system. However, no records have been kept that detail the frequency, location, quantity, cause, and affected area. The only information available is a trouble call log. There have been reports that some overflows have caused wastewater to be discharged into the nearshore marine environment. According to local personnel familiar with the system, the major causes for SSOs have been reported to be:

- Failure of the pumps at the lift stations due to clogging of the impellers.
- Capacity of the collection system exceeded during storm events. During storm events, the collection systems have on occasion received excessive Infiltration and Inflow (I/I) causing them to back up and overflow. I/I in the system can be attributed to a number of factors.

- Large portions of the existing collection systems in the Chalan Kanoa/Kobler Area and the Garapan Area were constructed in the early 70s. The original sewers were constructed using vitrified clay pipe (VCP). The age of the sewer along with the pipe material may give cause for concern for cracks, leaks, and structural damage.
- The sewers are located in areas that have a shallow groundwater table. Some of the sewers are located below the groundwater table lending for a higher possibility of infiltration.
- Localized flooding during storm events may lead to inflow at different points in the collection system (manholes, lift station wet wells, etc.).

#### 2.7 SOCIOECONOMIC CONSIDERATIONS

Saipan's population has increased over four fold between the 1970's to current levels. Much of the population increase occurred in the 1980's as a result of a burgeoning Asian tourist market. Unfortunately, the level of tourism has substantially decreased since the beginning of the Asian crisis in 1997.

In addition to tourism, Saipan's economy is based heavily upon light industrial (garmet factory) production. As a US protectorate nation, merchandise manufactured in Saipan may be sold with a "Made in the USA" label. This affords a marketing benefit for these products in the United States. Much of the work force in these garment factories are foreign (primarily Chinese) contract workers who retain neither residency or citizenship in Saipan. Land ownership in Saipan is limited to persons of indigenous origin. Therefore land ownership is an extremely important factor in the socioeconomic system of the island. Remedial measures that require conversion of private lands to public may prove difficult to implement. In addition, knowledgeable personnel interviewed while on Saipan suggested that whatever remedial measure is recommended should require low maintenance to assure long term success.

A number of scientific studies have been conducted on the island of Saipan over the past three decades. Many of the previous studies involved studying the biological communities and sediment contaminant levels present within the offshore environment. The data generated during these previous studies is summarized in the following sections. The final section in this chapter (Section 3.6) lists the additional environmental, hydrologic and biological studies required to establish baseline conditions existent in the project watershed prior to the initiation of remedial activities.

#### 3.1 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

A number of environmental investigations have been conducted on Saipan at formerly used defense sites created by the U.S. military during and shortly after World War II. These sites are currently being investigated by the USACE under the Defense Environmental Restoration Program: Formerly Used Defense Sites (DERP-FUD). No specific DERP-FUD project site has been identified within the project limits.

The Division of Environmental Quality (DEQ) and USEPA Region IX conducted limited sediment sampling from six offshore sites located around the municipal dump to the north of the project area in 1987. The sediment samples collected were analyzed for heavy metals and PCBs. An extensive follow-on sediment sampling investigation was recently completed within Tanapag Lagoon in the vicinity of the Puerto Rico dump (Denton et al., 2000). Surficial sediments were collected from 32 nearshore and 9 offshore stations and analyzed for heavy metals, polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs). All sediment samples were taken to a depth of 15 cm using hand-held aluminum corers. Three sediment cores were collected for separate analysis from within a 3-m diameter circle at each station. The sediment samples collected were analyzed for the following 10 heavy metals (Ag, Cd, Cr, Cu, Hg, Ni, Pb, Sn, Zn), the 20 chlorobiphenyls of greatest environmental importance based on their toxicological properties, and 16 common PAH compounds ranging in size from two to six fused aromatic rings.

Slightly elevated mercury and lead levels were measured in the vicinity of a sewer outfall and near the entrance to Saipan Harbor. Moderate levels of tin contamination  $(0.1\text{-}5.0~\mu\text{g/g})$  were observed in sediments collected from nearshore stations. All offshore stations in Tanapag Lagoon were relatively free of PCB contamination with total levels consistently below 1 ng/g. Moderate levels of PCBs were detected in sediments collected from two nearshore stations. This study concluded that PCBs do not pose a major threat to benthic communities in this area at the present time. PAHs were only detected in 33% of all offshore sediment cores compared with 81% from nearshore stations. Total sedimentary PAH concentrations ranged from non-detectable to barely measurable in the majority of offshore samples. Closer to shore, levels were often appreciably higher rising to 2.44  $\mu$ g/g near the docks and 3.23  $\mu$ g/g near the Puerto Rico dump.

Sediment sampling has not been conducted in the lagoon portion of the project site. A limited number of sediment samples should be collected and analyzed, at a minimum, for the same list of constituents evaluated during the recent Tanapag Lagoon investigation. The resulting data will be useful for establishing the baseline concentrations of constituents of concern (COC) present within the lagoon prior to the initiation of remedial activities. It will also be useful to compare the COC levels present in sediments from the project area lagoon with levels detected in sediments collected from the more heavily industrialized Tanapag Lagoon.

#### 3.2 PREVIOUS PHYSICAL OCEANOGRAPHIC STUDIES

The CNMI Marine Monitoring Team assesses the condition of the coral reefs in the CNMI on a regular basis. This periodic survey of the condition of the coral reefs provides a reliable indicator of changes in marine water quality in the nearshore lagoon environment. The pH of the lagoon is slightly lower than the open ocean due to increased carbon dioxide concentrations from biotic respiratory activity. Water temperatures vary from a low of 22°C to the upper thirties in the shallow swash zone along the beach. Even under conditions of no rain or runoff, salinity of the lagoon water varies generally with distance from the shoreline as a function of groundwater input and depth. It is not unusual for shoreline salinity to be several points lower than the full 35ppt ocean salinity typical over the outer coral reef. Terrigenous inputs to the lagoon waters can cause turbidity in lagoon waters due to suspended sediments (Pring-Ham and Kirby 1989). However, according to current studies within Saipan lagoon, these silt loads are apparently rapidly diluted and carried out to the open ocean by currents within the lagoon (USACE, 1980, Randall, et.al. 1987). These currents are powered primarily by the pumping action of breaking waves across the reef and tidal flux, and secondarily by wind and wave set-up along the beach. Resultant currents transport lagoon waters out to the ocean through several well-defined reef passages. During the vast majority of times when there is no runoff, the lagoon waters are typically of exceptional clarity.

The results from these previous oceanographic studies should be combined to produce an estimate of the probable residence time of water within the lagoon.

#### 3.3 PREVIOUS WATER QUALITY STUDIES

The Division of Environmental Quality (DEQ) monitors water quality on a weekly basis at 38 fixed stations located along Saipan's western facing coastal beaches. Six beach sites on the northeast coast of the island and six beach sites on the southeast coast are monitored on a quarterly basis. Eleven sites around Managaha Island are also monitored on a quarterly basis. Three of these monitoring locations (WB 22-Garapan Beach, WB 23-Garapan Drainage and WB 24-Chalan LauLau Beach) are located within the project area. The microbiological and chemical parameters monitored include: temperature, salinity, dissolved oxygen, pH, turbidity, and fecal coliform. DEQ has also just begun to test nutrient levels, including nitrate and reactive phosphate, on a monthly and quarterly basis at a

subset of these sites. The quality of water in Tanapag Harbor was also surveyed by Doty (1977) and M&E Pacific (1980). Nearshore values indicated that nitrate levels were higher in low salinity waters probably reflecting land-derived input to the coastal waters.

DEQ also monitors water quality in private and municipal water wells on a biannual and annual basis. The water quality data for nine wells located within the project watershed are compiled in Table 2. The groundwater present within the areas located on the lagoon side of Middle Road is very brackish and contains relatively elevated nitrate concentrations.

Most microbiological violations on Saipan have occurred in areas with heavy stormwater run-off, sewer overflows and leaking septic systems. Garapan was developed on a low-lying wetland and sewer overflows in this area can create standing pools of contaminated water that act as a continual source of fecal coliform contamination to the lagoon. As a result, the majority of fecal coliform violations tend to occur during the rainy season on Saipan (between July through November). Within the project area, the Garapan Beach monitoring site has had a total of four violations while the Garapan Beach Drainage and Chalan Laulau Beach stations have had three violations. This area also likely has a high density of septic tanks which contributes to nitrate contamination in the nearshore environment.

Water quality measurements of stormwater runoff on Saipan have not been made. However, a study (Zolan, 1981) conducted on commercial and residential areas of Guam may be used as an indicator of which chemical constituents may pose a threat to the lagoon environment in Saipan. This study found that runoff samples collected from commercially developed areas were generally much higher in metals levels than runoff from residential areas. The metals tended to be concentrated in the suspended load of the runoff rather than being present in the form of dissolved metal. Concentrations of mercury, cadmium, and lead in urban runoff occasionally approached or exceeded drinking and surface water quality standards. This study concluded that further analysis of receiving waters, sediments and biota were needed to determine the distribution of metals in Guam's environment.

Stormwater runoff samples need to be collected from the project watershed to evaluate the levels of pollutants entering the lagoon via this pathway. In addition, high frequency water quality monitoring (26 times per year) should be conducted at four sites within the project area that contain a high density of seagrass beds. This monitoring would provide the data required to statistically establish baseline water quality for the dry and wet seasons.

#### 3.4 PREVIOUS FLOOD AND RUNOFF STUDIES

A number of the original wetlands present on Saipan were filled during the Japanese era to provide areas suitable for farming. It is estimated that over 60 percent of the wetlands on Saipan were lost during this period (DEQ, 1999). These changes to the natural land cover led to increased rates of sediment and stormwater runoff from the island.

A large portion of the coastal plain from Garapan to Susupe-Chalan Kanoa is currently subject to flooding. The areas to the north (Garapan) and south (Chalan Kanoa) of the project site tend to be the most heavily impacted by flooding. Flooding within the project area appears to largely consist of localized ponding of excess runoff in the areas surrounding Beach and Middle roads.

Flood control studies completed by the USACE for the western shoreline of Saipan include "Draft Detailed Project Report and Environmental Statement Susupe-Chalan Kanoa Flood Control Study" (1979) and "Draft Detailed Project Report and Environmental Statement for the Garapan Flood Control Project" (1984). Because data was not available for the subject areas in these previous reports, the standard unit storm was assumed using precipitation data derived for Guam's Ugum river Study, and depth-duration curves were based upon State of Hawaii data. The primary causes of flood problems in the coastal plain area are the relatively flat topography, the absence of ponding-infiltration areas, and the lack of suitable outlets to convey runoff to the ocean. Initial development of this area for agricultural purposes undoubtedly eliminated the natural wetlands that would store runoff and promote infiltration. The current high density of urban development in this area is not conducive to re-construction of wetland areas.

Three measures to alleviate flooding in the Garapan area were given serious consideration in the USACE studies. Each of these measures involved structural improvements consisting of a diversion channel to convey floodwaters to an outlet channel that would discharge the flow into Saipan Lagoon. The proposed diversion channel was 15 to 20 feet wide at its base and the outlet channel widths varied from 40 to 50 feet. The preferred flood control plan identified by USACE required construction of a 5,720 foot long channel that would discharge into the lagoon near Tanapag Harbor, leaving the lagoon waters fronting Garapan and Puntan Muchot free from flood water input. However, the recommended plan has several inherent problems including:

- The potential for disturbing unknown subsurface historic sites;
- Potential alteration of remaining wetland sites;
- Strong opposition from the National Park Service to construction of one outlet channel through a portion of the American Memorial Park;
- Opposition from the CNMI Department of Natural Resources because the channel traverses a wetland and may endanger birds in the area; and
- Concern about the unknown environmental impact of adding a large flux of flood waters at a single point discharge into Saipan Lagoon

The United States Geological Survey (USGS) maintained a stream gage within the Talufofo Watershed for a number of years (Van der Brug, 1985). Aside from this locality, there are no other perennial streams on Saipan. The Soil Conservation Service has prepared a soil map for the island of Saipan. This document also contains permeability and erosion rates for Saipan soils.

The National Resources Conservation Service (NRCS) conducted an extensive flood and runoff study for the Kagman watershed, on the eastern side of Saipan. Stormwater runoff rates were calculated for this watershed using a Soil Conservation Service computer model that was calibrated to the USGS gage results obtained from the South Fork of Talufofo Stream. Sediment budgets for the area were calculated using the Universal Soil Loss Equation (USLE) and Sediment Delivery Ratios (SDR).

A detailed flood and runoff study has not been conducted for the project area. A study using a similar technical approach utilized by NRCS should be conducted for this area so that peak discharge volumes and sediment loads entering the lagoon environment can be calculated.

# 3.5 PREVIOUS MARINE BIOLOGICAL SURVEYS IN LAGOON AREA

Saipan has had a number of biological surveys conducted by a variety of highly qualified observers during the past half century. Beginning in the 1950's, Schultz and others (Shultz, et.al., 1953, Cloud, 1959) characterized the richness of the tropical coral reef fish assemblage and shoal-water ecology in Saipan. In the 1970's numerous studies were completed, primarily through individuals associated with the University of Guam Marine Laboratory, concerning the abundance of algae (Tsuda & Tobias, 1977; Fitzgerald, 1987), calcareous coraline algae (Gawell, 1974), and reef fishes. In 1977 a study of the harbor area near the proposed mooring site of a power barge brought together a wealth of information regarding the abundance of marine resources present even in an area considered by many to be degraded (Doty & Marsh, 1977). Much of the above works are summarized by Amesbury (Amesbury, et.al., 1979) who defines habitat types and characteristics for Saipan Lagoon. The first general atlas of marine resources of Saipan Lagoon based largely on the habitats defined by Amesbury was completed by Eldridge in 1980. Several other reports, typically requisitioned as a result of specific development proposals, have added significantly to the substantial base of marine biological knowledge of this resource, including a marine survey of the northern Tanapag Reef (Randall et.al., 1987). Much of this information on lagoon habitats and distribution has been digitized and included in the government's GIS database. Given the abundance of background and baseline information, it is fortunate that the CNMI Government and Division of Environmental Quality (DEQ) has established through the CNMI Marine Monitoring Team a program of regular reef monitoring surveys. These surveys will continue to be of great importance for monitoring changes to the reef ecosystem brought about by changes in the water quality of the lagoon.

# 3.6 IDENTIFICATION OF DATA GAPS FOR PROECT AREA

The review of previous biological and environmental studies conducted on Saipan identified a number of additional studies required to adequately establish baseline environmental conditions within the lagoon. These studies should be completed prior to the initiation of remedial measures

within the project area so that the effectiveness of these measures can be evaluated in the future. Each of the recommended studies is discussed in greater detail in Section 4.

The following additional studies are required to establish baseline environmental conditions present within the project area:

- Stormwater Quality Investigation
- Analyze Lagoon Sediments for Physical and Chemical Parameters
- Marine Habitat Mapping from Historical and Current Aerial Photographs
- Inshore Lagoon Area Seagrass and Associated Fauna Survey
- Inventory of Potentially Contaminating Activities in Watershed
- Hydrologic Study of Runoff Processes in Watershed
- Groundwater Level Investigation in Watershed
- Lagoon Water Quality Investigation
- Sanitary Sewer Overflow Assessment of Project Area Collection Systems
- Residence Time Study of Lagoon Water

The studies recommended in this section were selected to provide baseline information on the environmental conditions present within the lagoon and contributory watershed as well as the quality and quantity of runoff entering the lagoon. The data generated by these studies will be combined with the existing site data discussed in Section 3 and can be used to refine the design of future remedial measures. A number of the studies recommended below involve collecting baseline environmental data for the measurable aquatic ecosystem unit proposed for monitoring (i.e., seagrass habitat).

#### 4.1 STORMWATER QUALITY INVESTIGATION

Storm water quantity and quality should be investigated and correlated with rainfall and up-slope land use. Samples and volume estimates should be collected from drainage outlets number 1, 4 and 13 (Figure 7) along Beach Road, and drainage outlets located along Middle Road. A minimum of two rounds of sampling should be conducted, preferably corresponding to storm events occurring during both the dry and wet seasons. If possible, the stormwater sample should be collected within the first half inch of runoff. This is consistent with the "first flush" concept that holds that the first half inch of runoff from any given event will carry 95% of the pollutants transported as a result of that event. Approximate stream flow rates should be measured at the time the stormwater sample is collected. An attempt will be made to measure the total volume of suspended sediment transported during the two monitored storm events by surveying the height and extent of the deltaic deposits that form around the major storm drains after large rainfall events. The stormwater samples should be analyzed, at a minimum, for suspended sediment load, nutrients, pH, turbidity, fecal coliform bacteria and priority pollutant metals. The exact list of constituents of concern (COC) monitored will be based upon the results of the Potentially Contaminating Activities (PCA) survey (Section 4.5), which will identify the types of chemical pollutants that may exist within the watershed.

This investigation will generate useful information on the sediment and nutrient loads entering the lagoon environment. This data will also be useful for future Total Maximum Daily Load (TMDL) studies required for future updates to the island of Saipan's Water Quality Management Plan.

# 4.2 ANALYZE LAGOON SEDIMENTS FOR PHYSICAL AND CHEMICAL PARAMETERS

Lagoonal sediments need to be investigated since they act as major sinks for many of the more persistent and potentially toxic organic and inorganic chemicals introduced into the aquatic environment (Ingersoll 1995). Sediment chemical data provides useful data for evaluating the environmental quality of the lagoon environment and will provide and invaluable baseline for future studies. Sediment samples should be collected along three transects oriented parallel to the shoreline in the lagoon (Figure 9). A total of six composite samples should be collected along each transect.

The sampling locations will roughly correspond to the locations of the six largest stormwater runoff drainage outlets located along the shoreline within the study area. The samples should be collected to depths of 15 centimeters using hand-held aluminum corers. Three separate sediment samples will be collected from a five-meter circular area at each sampling location and combined to generate a single composite sample for analysis. The sediment samples will be analyzed, at a minimum, for grain size, organic carbon content, metals (Ag, Cd, Cr, Cu, Hg, Ni, Pb, Se, Sn, Zn), the 20 chlorobiphenyls of greatest environmental importance based on their toxicological properties, and 16 common PAH compounds ranging in size from two to six fused aromatic rings. Additional COC's may also be analyzed depending on the results of the PCA survey (Section 4.5). The chemical data generated during this study will be compared to the contaminant levels recently measured in sediments collected from Tanapag lagoon (Denton et al, 2000).

# 4.3 MARINE HABITAT MAPPING FROM HISTORICAL AND CURRENT AERIAL PHOTOGRAPHS

Coral communities, algae beds, and shorelines are not static systems; they naturally change over time in response to their surroundings. There are multiple sources of aerial photographs of the Saipan Reef extending back to World War II. In 1980, Eldridge and Randall used a set of USGS photographs to provide the first base maps of the lagoon communities. Amesbury and others have used these maps and supplemental ground observed information to produce the various habitat maps and descriptions presently in use. More recently the USGS, NOAA, and NASA have completed additional photographs and multi-spectral images from various platforms. These map resources should be compiled and compared to the older aerial maps. Information can be obtained relating to shifts in coral colonies, algae abundance, and shoreline erosion and accretion. This information would be invaluable to resource managers charged with the long-term management of resources for future generations.

## 4.4 INSHORE LAGOON AREA SEAGRASS AND ASSOCIATED FAUNA SURVEY

There is presently an adequate mechanism in place for the monitoring of the coral reef and lagoon habitats in the project area. However, the first ecosystem likely to be impacted by lower water quality will be the inshore seagrass habitats and associated fauna. This information gap needs to be filled as soon as possible and the results compared to previous surveys to document the extent of historical change to this habitat.

Thereafter, a simple monitoring strategy for the segrass habitats must be developed that can be successfully undertaken by the CNMI Marine Monitoring Team on a regular and systematic basis. This seagrass monitoring program will be the primary tool used to measure the effectiveness of any

environmental resource remediation strategies implemented as a result of this project, such as implementation of best management practices for sewer line maintenance.

## 4.5 INVENTORY OF POTENTIALLY CONTAMINATING ACTIVITIES IN WATERSHED

Potential contaminating activities (PCAs) that reside within the watershed should be inventoried. Some examples of PCAs on Saipan that should be inventoried include fuel storage facilities such as gas stations, garment factories, septic systems, leach fields, sanitary sewer overflow points, automotive repair facilities, cattle feed lots, intensive agriculture activities, underground and aboveground fuel storage units, and dry cleaning or large-scale laundry operations.

A generic list of PCAs and their associated contaminants should be created. The PCA list will include known sources of contamination, significantly high-risk activities, and other activities that will require a field evaluation during the inventory process. The PCAs will be grouped into categories of Very High, High, Medium, and Low reflecting their relative potential to contaminate the lagoon waters. Factors that will be considered when placing a PCA into a certain category include: 1) the nature of the activity, 2) contaminants associated with the activity, and 3) association with historical incidents of groundwater contamination. A list of chemicals associated with individual PCAs should also be created. This list will be used to associate particular contaminants of concern with each specific type of PCA identified within the watershed.

The PCA inventory will yield an inventory of potentially contaminating sources present within the watershed at the present time. By collecting this baseline information, future changes in chemical loading to the lagoon environment can potentially be related to future changes in land use within the watershed. This information will also be used to finalize the list of chemicals monitored during the stormwater quality (Section 4.1) and sediment analysis (Section 4.2) studies.

## 4.6 HYDROLOGIC STUDY OF RUNOFF PROCESSES IN WATERSHED

A hydrologic analysis for the project watershed is required. This analysis will provide estimates of watershed yield and peak discharges to the shoreline. This hydrologic data is required to properly design storm water quality facilities (e.g. sedimentation basins) so that the sediment retention efficiencies can be obtained.

The first step in the analysis is to delineate and map the various watersheds within the project area. Individual watershed areas will likely need to be sub-divided into smaller subareas of comparatively homogeneous slope, soil and vegetative cover. These areas would then be grouped and erosion rates calculated on the basis of land use, soil, and slope within each subarea. Peak discharges for the project watersheds will be estimated by using an appropriate computer model. Sediment budgets for the areas that contribute to stormwater discharge along the shoreline should be prepared using the Universal Soil Loss Equation (USLE) and site-specific Sediment Delivery Ratios (SDR). The USLE

computes average annual erosion rates. The model results will be calibrated using the suspended sediment loads measured during the two rainfall events monitored for the stormwater quality investigation (see Section 4.1).

### 4.7 GROUNDWATER LEVEL INVESTIGATION IN WATERSHED

The direction and gradient of groundwater flow within the watershed should be determined. This data will be used to estimate the discharge rate of groundwater along the shoreline within the project area. Approximately 25 wells are located within the project watershed. The elevations of up to eight of these wells should be surveyed (Figure 10). Synoptic water level measurements should then be made at these wells and at a lagoon monitoring site (the Fishing Base Pier) over a three-day period. Fluctuations in water levels in the coastal wells due to tides will require that pressure transducers be used to accurately determine the average regional water levels over a minimum three-day period. The hydrologic information collected will be useful for optimizing the design of future stormwater re-injection or infiltration systems. The data will also allow a more accurate estimate of the flux of groundwater that enters the nearshore lagoon within the project area.

### 4.8 LAGOON WATER QUALITY INVESTIGATION

In order to achieve better spatial coverage within the project shoreline area, additional sampling is recommended at new shoreline sampling locations. This data will augment the existing data being collected by DEQ at sites WB 22, WB 23 and WB 24 (Figure 11). Sampling should be augmented to include four areas along the length of the project area; three samples should be collected from each area; one at the shoreline, one beyond the seagrass beds at the surface, and one beyond the seagrass beds near the bottom. Information on tide, wind direction, swell height, and current speed and direction should also be acquired. Samples should be taken at early morning every other week for one year and on a daily basis following at least two storms coincident with the storm water sampling project. This data will allow for the computation of a log-normal statistical baseline for the dry season, wet season, and include variance for storm runoff. In addition a salinity/temperature probe should be used during dry weather and low tide to map salinity temperature profiles along the project shoreline over a period of one tidal cycle. This data will allow a more accurate calculation of residence time within the lagoon and help locate groundwater input sites along the shoreline.

# 4.9 SANITARY SEWER OVERFLOW ASSESSMENT OF PROJECT AREA COLLECTION SYSTEMS

It is suspected that a significant amount of the nutrient and bacteriological contamination along the shoreline arises from overflows and leakage from the sewer system. Although the sewer system within the project area is currently being installed and is not expected to have overflow problems, a

sanitary sewer overflow (SSO) study of the collection systems in Garapan and Chalan Kanoa should be conducted. The major concern being backups in the older collection systems in Garapan and Chalan Kanoa can lead to backups and SSOs within the new sewers of the project area.

At present, there are no official records kept on SSOs that document the frequency, location, quantity spilled, cause, and affected area. In addition, no records are kept on the frequency of sewer line maintenance and pump station maintenance. This information is important because it helps to identify the problem areas in the collection system, the different types of problems, and the severity of the problems. As a first step, information/data of this type should be collected for all SSOs and maintenance activities and stored in a historical database.

After a reasonable amount of data is collected (approximately one to two years), problem areas can be identified and prioritized. Depending on the nature of the problem identified, a number of different types of studies may be conducted for a particular problem area. Some of the different types of studies that may be conducted include the following:

- Closed circuit television inspection of the sewer lines. This type of inspection is useful in identifying the structural condition of the pipe (i.e. cracks and broken pipes), infiltration points, and problem sources (i.e. grease, roots, and structural damage).
- Infiltration and inflow (I/I) study. This type of study is used if excessive I/I is suspected. It is useful in identifying the approximate location and quantity of I/I sources. It may be helpful in identifying areas that require CCTV inspection.
- Capacity analysis of the collection system. This type of study helps to identify areas in the
  collection system (i.e. pump station and trunk lines) that need to upgraded because the
  existing capacity is exceeded due to increased flow rates from collection system expansion or
  increased wastewater generation.

The results from these studies will allow the government to focus future expenditures of limited infrastructure maintenance funds on those sections of the sewer system that are creating the most environmental damage.

# 4.10 RESIDENCE TIME STUDY OF LAGOON WATER

At least two studies of current speeds and patterns within the lagoon have been conducted. The original data from these studies needs to be obtained and integrated with bathymetric charts to calculate the residence time of water at various points within the lagoon. These results need to be combined with storm water inflow calculations to determine the probable concentrations and residence time of pollutants within the lagoon. This number is necessary to determine the total maximum daily load of pollutants that can be allowed to enter the lagoon through point and non-

point sources without damaging the reef ecosystem. This calculation is also useful for the design (sizing) of storm water retention basins.

### 4.11 RANKING OF PROPOSED ADDITIONAL INVESTIGATIONS

The studies recommended in this section are listed in Table 3 according to three categories: relative importance of study for addressing existing data gaps, the relative cost of the study, and the estimated duration of the study. While all of the recommended studies are required to provide missing baseline data prior to the initiation of remedial activities, some of the studies are deemed more critical than others. Cost is also a consideration since only a limited budget exists for the second phase of this study.

The estimated cost of these studies has been classified into three categories: Low, Medium, and High. Low cost studies are estimated to cost less than \$20,000, medium cost studies between \$20,000 and \$60,000, while high cost studies greater than \$60,000 to complete. The relative duration required to complete the recommended studies is also estimated in this table. Short duration studies are estimated to require less than one month to complete. Medium duration studies are estimated to require between one and four months to complete while long duration studies would take between four to twelve months.

Meetings were held in Saipan in early March 2001 with representatives of the U.S. Army Corps of Engineers, Environet, CNMI Department of Environmental Quality and CNMI Department of Public Works. Several decisions arose out of these meetings regarding which studies that would be conducted during the Phase II portion of this project. It was decided that three of the proposed studies, Groundwater Level Investigation in Watershed (Section 4.7), Sanitary Sewer Overflow Analysis (Section 4.9), and Residence Time Study of Lagoon Water (Section 4.10), while important, were not critical to the completion of this project. In addition, DEQ offered to assist the Corps and their Contractors in collecting samples and data for some of the remaining studies. In particular, DEQ has agreed to assist with sample collection and monitoring for those tasks that require working in the lagoon. DEQ will assist the Corps contractor with collecting samples for the Stormwater Quality Investigation (Section 4.1) and the Lagoon Sediment Analysis (Section 4.2). DEQ will also conduct the nearshore lagoon sea grass and fauna surveys (Section 4.4) and will provide runoff observations for the Hydrologic Study of Runoff Processes in Watershed study (Section 4.6).

One of the primary causes of nearshore marine water quality degradation or contamination is storm water runoff carried to the shoreline through natural or man-made drainage structures or via overland flow. Other contributing factors include inadequate infrastructure (e.g., sewage overflows), and accidental spills or leaks of contaminants from industrial facilities located near the shoreline. An environmental restoration program must address each of these potential sources to be successful. Once remedial measures are implemented, the resultant improvements in water quality will increase the nearshore fish population (by improving their habitat) and reduce the frequency of beach closures to public recreational uses.

Several alternatives are discussed below that, if implemented, may improve the water quality and aquatic habitat present in the nearshore lagoon environment in the project area. The alternatives under preliminary consideration include regulatory considerations, improved watershed management, and undertaking infrastructure improvements to reduce the amount of sediments and contaminants that discharge into the ocean. These alternative were tentatively identified by EI based on the limited environmental data currently available and may be changed or modified as more data becomes available. Regulatory considerations are briefly reviewed because they form the basic legal framework under which the studies proposed in Section 4 and tentative restoration alternatives presented in Sections 5.2 and 5.3 should be completed. The U.S. Army Corps of Engineers cannot assist the Saipan government in funding activities related to regulatory compliance. Implementation of regulatory measures and development of public education programs and a watershed management plan are the local governments responsibility.

An important task that must be completed prior to implementing any restoration project is to collect sufficient data to establish existing environmental conditions. This data will help determine appropriate restoration measures and establish a baseline for monitoring the progress of future environmental restoration work. Section 4 provides a discussion of proposed studies that will address the deficiencies in the existing environmental data available for the western shoreline of Saipan.

### 5.1 REGULATORY CONSIDERATIONS

There are a number of federal regulations and programs that address, either directly or indirectly, nearshore water quality issues. Implementation of these regulations will require additional personnel and resources, and a strong commitment from the CNMI government to enforce the regulations. The CNMI government has enacted some regulations, such as the DEQ Earthmoving and Erosion Control Permit, that will potentially improve nearshore water quality. Compliance with the permit requirements is monitored by DEQ.

The primary water quality regulations are promulgated under the Clean Water Act (CWA), which required States and territories, including the CNMI, to promulgate water quality standards. Section 319 was added to the Clean Water Act in 1987 and established the national Non-Point Source

program. Congress has provided funding under Section 319 to States and tribes for the control of non-point source pollution since 1989. The Non-Point Source program is locally focused and state administered.

The National Pollutant Discharge Elimination System (NPDES) Program under the CWA also requires certain industrial activities, including publicly owned treatment works (POTW), to obtain discharge permits. NPDES also provides nationwide General Permits, which provide permit coverage for certain industrial activities that do not require individual permits, provided the activity complies with the conditions of the General Permits.

On December 8, 1999, EPA published Phase II NPDES permitting requirements for small municipal separate storm systems (MS4) (those serving less than 100,000 persons) and construction sites that disturb one to five acres. The rule allows for the exclusion of certain sources from the national program based on a demonstration of the lack of impact on water quality, as well as the inclusion of others based on a higher likelihood of localized adverse impact on water quality. The regulations also exclude from the NPDES program storm water discharges from industrial facilities that have "no exposure" of industrial activities or materials to storm water. It appears that Saipan is not currently subject to this regulation. However, as population on the island rises and the urban population density increases, the Phase II NPDES permitting requirements may become applicable in the near future.

Other regulations, while not addressing water quality specifically, that may have an impact on nearshore water quality include those promulgated under the Resource Conservation and Recovery Act (RCRA), Toxic Substance Control Act (TSCA), and the Oil Pollution Prevention Act (OPA). RCRA regulations govern the management of hazardous waste and underground storage tanks; TSCA regulates the use and disposal of PCB containing materials; and OPA requires the preparation of spill prevention, control, and countermeasure (SPCC) plans and spill response plans. Compliance with these regulations would reduce the amount of contaminants released into the environment, thereby reducing the amount of contaminants carried to the ocean in storm water runoff.

It should be noted that if federal funding is to be used to conduct water quality restoration projects, the National Environmental Policy Act (NEPA) requires that an Environmental Assessment (EA) for the entire project area on the western side of Saipan be performed. Several of the alternatives outlined in the following section may have a significant impact on the environment. Therefore, more comprehensive Environmental Impact Statements may need to be prepared prior to implementation of some of the remedial alternatives recommended below.

Specific regulatory measures that should be considered to address the problems associated with sediment accumulation and entrained pollutant loads in storm water runoff include:

• Revise existing construction permit requirements so that storm water retention capacity standards are current and appropriate for conditions on Saipan.

- Establish storm water drainage standards for new construction and for upgrades of existing infrastructure.
- Review and enforce existing construction Best Management Plans to reduce runoff and sediment loads from development sites.
- The future drainage master plan update for the island should emphasize construction standards that minimize future sediment discharge to the nearshore lagoon environment.
- Review and update existing erosion and sediment control management guidelines, rules and regulations.
- Explore land use control measures such as limiting the size and nature (i.e., commercial, residential, recreational) of future developments between Beach Road and Middle Road.
- Establish a review process for future developments to ensure that storm water runoff concerns are considered and addressed.

## 5.2 INFRASTRUCTURE IMPROVEMENTS

The following infrastructure improvements should be considered to reduce the volume of sediments and improve the quality of stormwater currently entering the lagoon.

- Construct storm infiltration structures to reduce the amount of runoff that reaches the lagoon. Examples of infiltration structures include injection wells and perforated piping buried under roadways, infiltration trenches and basins. Infiltration facilities rely on the percolation of storm water runoff through surface soils. Pollutants are captured by soil particles as the filtered water percolates down into groundwater. Use of infiltration facilities is dependent on suitable soils and groundwater protection issues. One possible way of establishing an infiltration basin is to construct a multipurpose recreational facility (football, baseball, and soccer fields) between Beach and Middle Roads. The project area is suitable for this type of system due to the high permeability of the coastal sediments. In addition, a properly located infiltration gallery may provide a partial hydraulic barrier to saltwater intrusion for inland, potable well sources (e.g. Gualo Rai wells). An infiltration system patterned after the Guam San Vitores Road project, where a large underground infiltration gallery is placed directly beneath a significant length of either Beach or Middle road, is another possible alternative.
- Construct/install storm water filters such as vegetation filters or physical filters. Examples of
  vegetation filters include tall grass covered drainage swales and vegetation covered marshes
  (wetlands). Examples of physical filters include grates, screens, and rock and sand filters
  designed to trap particles of various sizes that are entrained in storm water.

- Construct small settling ponds up-slope of Beach Road on each major storm drain outlet to reduce the amount of sediment transported to the shoreline. These basins could double as small parks, playgrounds, or parking lots.
- Construct one or two major storm water retention and infiltration basins between Beach Road and Middle Road. Investigate the possibility of these basins doubling in function as soccer, rugby, baseball or other recreational sporting fields and associated facilities.
- Construct diversionary structures to keep clean rainfall away from contaminant sources.
   Examples include diverting rainfall runoff from areas of land disturbance at construction sites.
- Continue with present plans to update, improve, and extend existing sewer system. Establish deadlines to require connection for all waste water systems and abandonment of septic tank and leach field systems located within the project area. Leaks from the existing sewer lines are the suspected primary source of high nitrate levels and fecal coliform that are periodically detected in the lagoon waters. The sewer line study in Section 4.11 provides a discussion of additional information that will be required to implement this alternative.
- Devise engineering controls to minimize failures in pumps at lift stations and improve maintenance of lift stations.
- Road improvements should take into account methods to minimize sediment transport.
   Design curbs to channel flow to infiltration areas and pave existing unpaved roads that are prone to erosion in the coastal zone.

Future infrastructure improvements need to be coordinated with the design requirements developed in the ongoing USACE Saipan Drainage Master Plan and take into consideration projected population growth and urban development on the island. Infrastructure improvements that will likely have an impact on nearshore water quality during construction may require a Section 401 Water Quality Certification (WQC) Form. Section 401 refers to that section in the Clean Water Act, which is regulated by DEQ. A WQC is issued when there is a corresponding federal permit for an activity that may result in water quality degradation. All construction projects on Saipan require a DEQ Earthmoving and Erosion Control Permit which requires "24 hour storage of 25-year, 24-hour storm; or 75% sediment removal rate" for both during-construction stormwater systems and post-construction stormwater systems.

### **5.3 WATERSHED MANAGEMENT**

The rapid rise in population on Saipan over the past two decades has led to increasing urbanization of the island. Urbanization increases overland runoff into the ocean because building and roadway construction decreases open space and permeable land area. Urbanization also increases the amount of pollutants released into the environment from a concentration of people and potential sources, and consequently increases the contaminants that are carried to the lagoon in runoff and via groundwater.

Watershed management involves a combination of regulatory enforcement, infrastructure improvement, and urban planning to reduce the introduction of pollutants to a land area, and to minimize the amount of storm water runoff, which carries the pollutants to the lagoon. The preliminary remedial measures under consideration involve the preparation of a watershed management plan. Components of the plan may include:

- Identify major source areas of sediments entering the lagoon.
- Evaluate the effectiveness of initiating reforestation of currently denuded portions of the
  watershed to minimize soil erosion. Special consideration should be given to native tree,
  shrub, and grass species (this may have the added benefit of reestablishing threatened or
  endangered species).
- Educate the public to reduce unnecessary application of fertilizers, pesticides, and improper disposal of household chemicals.
- Insure better enforcement of existing environmental regulations (see Section 1.4)
- Discuss the possibility of instigating land use control measures such as limiting the size and nature (i.e., commercial, residential, recreational) of future developments, especially in the area between Beach and Middle roads.
- Discuss the need to adopt zoning laws that maximize permeable areas and open spaces within areas undergoing urban development.
- Discuss the need for establishing drainage easements between Middle Road and Beach Road prior to the area becoming even more urbanized.
- Implement recommended infrastructure improvement projects (see Section 5.2).

Amesbury, S.S., D.R. Lassuy, R.F. Meyers & V. Tyndzik. 1979. A survey of the fish resources of Saipan lagoon. University of Guam, Marine Laboratory, Report prepared for the Office of Coastal Zone Management, Commonwealth of the Northern Mariana Islands. Technical Report No. 32

Amesbury, S.S. 1982. Effects of Turbidity on Shallow-Water Reef Fish Assemblages in Truck. Proceedings of the Fourth International Coral Reef Symposium, Manila, 1: 155-159.

Amesbury, S.S. and J.H. Francis. 1988. The Role of Seagrass Communities in the Biology of Coral Reef Fishes. Experiments with Artificial Seagrass Beds. Sea Grant Quarterly, 10(1): 1-6.

Amesbury, S.S., D.R. Hopper and H.R. Sanger, 1992 (Abstract). Reciprocal Interactions of Fish and Seagrass in a Tropical Lagoon Habitat. In: Proceedings of the Seventh International Coral Reef Symposium, Guam 1992.

Birkeland, C. 1982. Terrestrial Runoff as a Cause of Outbreaks of Acanthaster planci (Echinodermata: Asteroidea). Marine Biology 69:175-185.

Cloud, D.E., Jr., R.G. Schmidt, and H.W. Burke, 1956. Geology of Saipan, Mariana Islands, U.S. Geological Survey, Prof. Paper, 1350:5-54.

CNMI Division of Environmental Quality. 1997. Adopted Amendments and Revisions to Water Quality Standards Promulgated under the Authority of 2 CMC3101 to 3134 and 1 CMC 2601 to 2605 by the Department of Public Works.

Cuet, P. and O. Naim. 1992. Analysis of a Blatant Reef Flat Degradation in La Reunion Island Fringing Reef. In: Proc. 7<sup>th</sup> Int. Coral Reef Symposium Guam, p. 313-322.

Denton, G.R.W., L.P. Concepcion, H.R. Wood, V.S. Elfin & G.T. Pangelinan. 1999. Heavy Metals PCGs and PAHs in Marine Organisms from Four Harbor Locations of Guam. A Pilot Scale. Water and Environmental Research Institute of the Western Pacific. University of Guam Technical Report No. 87.

Denton, G.R.W., L.P. Concepcion, H.G. Siegrist, H.R. Wood, and B. Bearden, 2000. Heavy Metals, PCBs, and PAHs in Surficial Sediments from Tanapag Lagoon, Saipan: A Preliminary Investigation. Report prepared by Water and Energy Research Institute of the Western Pacific, University of Guam and Saipan Division of Environmental Quality.

Department of Natural Resources, and United States Department of Agriculture, Soil Conservation Service. Final Watershed Plan- Environmental Impact Statement. Kagman Watershed, Saipan, CNMI. Responsible Agencies: Saipan and Northern Islands Soil and Water Conservation District, Commonwealth of the Northern Mariana Islands.

Department of Natural Resources, Division of Fish and Wildlife, 1994. Biological analysis of the nearshore reef fish fishery of Saipan and Tinian.

Department of Natural Resources, Division of Fish and Wildlife, 1998. Summary and Further Analysis of the Nearshore Reef Fishery of the Northern Mariana Islands. Federal Aid in Sportfish Restoration Act Project F-1-R-15, Tech. Report 98-02.

Division of Environmental Quality. 1999. Commonwealth of the Northern Mariana Islands Water Quality Assessment 305(b) Report. Saipan, CNMI. 97 pp.

Doty, J.E. 1977. Marine survey of Tanapag Harbor, Saipan: the power barge "Impedance." University of Guam, Marine Laboratory, Technical Paper No. 33.

Duenas and Swavely, Inc. 1995. Saipan Lagoon Use Management Plan. Volume IV Executive Summary, Report prepared for Resources Management Office of the CNMI.

Duenas and Swavely, Inc. 1995. Saipan Lagoon Use Management Plan. Volume 1 Data and Analyses pIV-1 to IV-VI-1. Report prepared for Resources Management Office of the CNMI.

Eldredge, L.G. and R.H. Randall. 1980. Baseline atlas of the reefs and beaches of Saipan, Tinian and Rota, report prepared by the Coastal Resources Management Program, Executive office of the Governor, Commonwealth of the Northern Mariana Islands.

Eldredge, L.G. 1987. Coral Reef Alien Species, pages 215-228 in B. Salvat, editor, Human impact on coral reefs: Facts and recommendations. Antenne Museum Ecole Practique des Hautes Etudes, French Polynesia.

Fitzgerald, W.J. and W.J. Tobias. 1974. A Preliminary Survey of the Marine Plants of Saipan Lagoon, 20p.

Fitzgerald, W.J., Jr. 1987. Environmental Parameters Influencing the Growth of Enteromorpha Clathrata (Roth) J. Ag in the Intertidal Zone of Guam. Botanica Marine 21:207-220.

Fury, J., 2000. Island Ecology & Resource Management, Commonwealth of the Northern Mariana Islands. Four volume set edited by John Furey.

Gawell, M. 1974. A Preliminary Survey of the Calcareous Coraline Algae of Saipan Lagoon, 9 p.

Jameson, S.C., M.V. Erdman, G.R. Gibson & K.W. Potts. 1998. Development of Biological Criteria for Coral Reef Ecosystem Assessment. In: Coral Research Bulleting No. 450: 1-100.

Kaly, U.L. 1992 (Abstract). The Restoration Ecology of Tropical Marine Habitats: A Framework. In: Proceedings of the Seventh International Coral Reef Symposium, Guam 1992.

Karig, D.E., 1971. Origin and Development of Marginal Basins in the Western Pacific. J. Geophys. Res., 76:2542-2561.

Karolle, B.G. and T.B. McGrath, 1985. Defense environmental restoration program, Saipan, Tinian, etc.

Klinckhamers, P., 1992. Western Samoa: Land-Based Pollution Sources and their Effects on the Marine Environment. A consultant report prepared by Pavel Klinckhamers for the South Pacific Regional Environment Programme, dated October 1992.

Kuhn, J.J. and Wessies, G.A., 1999. Revised Universal Soil Loss Equation Field Handbook for the Pacific Area. U.S. Department of Agriculture, Natural Resources Conservation Service, Pacific Basin Area. Field Office Technical Guide, Section 1. Prepared November 1999.

Matson, E.A., 1993. Nutrient flux through soils and aquifers to the coastal zone of Guam (Mariana Islands. Limnology and Oceanography, 38:361-371.

M.E. Pacific, Incorporated, 1980 Saipan lagoon circulation study. Study dated June 1980 prepared for U.S. Army Corps of Engineers.

Moore, P., 1977. Inventory and mapping of wetland vegetation in Guam, Tinian, and Saipan, Mariana Islands. Report prepared for the U.S. Army Corps of Engineers, Pacific Ocean Division, Fort Shafter, University of Guam, Biosciences.

Nelson, S.G., D.B. Matlock & J.P. Villagomez, 1982. Distribution and Growth of the Agarophyte Gracilaria Lichenoides (Rhodophyta) in Saipan Lagoon. Sea Grant Quarterly 4(1): 1-6.

Neubauer, C.P. 1983. The Effects of Land Clearing on a Small Watershed in Southern Guam. M.S. Thesis, University of Guam, L. Raulerson, Advisor, 55p.

Northern Islands Company, Saipan. 1989. Storm Water Control Handbook: prepared for the Commonwealth of the Northern Mariana Islands, Soil, and Water Conservation Districts of Saipan and Northern Islands, Tinian and Aguiguan Luta,

Porcher, M. and J. Pellissier. 1992 (Abstract). Physical and Biological Restoration of a Damaged Coral Reef Area: Methodology and Technical Recommendations. An Example: The Experimental Work Site Realized for the Rehabilitation of the Moorea Beachcomber Parkroyal Hotel on Moorea. In: Proceedings of the Seventh International Coral Reef Symposium, Guam 1992.

Pring-Ham, Cynthia, K. & K.J. Kirby. 1989. Suspended Sediment Load Study at Saipan Lagoon and Laulau Bay. Report to Coastal Resource Management Office and Division of Environmental Quality, Saipan Dept. of Public Health.

Randall, R.H. (editor) 1987. A Marine Survey of the Northern Tanapag Reef Platform, Saipan, Mariana Islands. University of Guam, Technical Report No. 87.

Randall, R.H., 1987. Assessment of Coral Damage Caused by a Grounded Barge on Tanapag Barier Ref, Saipan, CN.

Randall, R.H., S.D. Rogers, E.E. Irish, S.C. Wilkens, B.D. Smith & S.S. Amesbury. 1988. A Marine Survey of the Obyan-Naftan Reef Area, Saipan, Mariana Islands, 62 p.

Schonder, C., 1999? GIS Based Saipan Watershed Resources Atlas: a Project Report. University of Oregon, Micronesia and South Pacific Program.

Tsuda, R.T. and W.J. Tobias. 1977. Marine Benthic Algae from the Northern Mariana Islands, Chlorophyta and Phaeophyta. Bull. of Jp. Soc. Phycology 25:67-72.

Tsuda, R.T. and W.J. Tobias. 1977. Marine Benthic Algae in the Northern Mariana Islands, Cyanophyta and Rhodphyta. Bull. Jp. Soc. Phycology, 25:155-158

U.S. Army Engineer District, Honolulu, 1981. Final detailed project report and environmental statement: Saipan small boat harbor, Saipan, Commonwealth of the Northern Marianas.

U.S. Army Corps of Engineers, Honolulu District, 1984. Garapan flood control, Saipan, Northern Marianas: Draft detailed project report and environmental statement.

U.S. Army Engineer District Honolulu, 1986. Susupe-Chalan Kanoa flood control study, Saipan Commonwealth of the Northern Mariana Islands: Final detailed project report and environmental impact statement.

U.S. Fish and Wildlife Service. 1979. Biological reconnaissance report: Flood control project in the Chalan Kanoa/Susupe area, Saipan, Commonwealth of the Northern Mariana Islands.

U.S. Fish and Wildlife Service. 1979. Biological reconnaissance report: Flood control project in the Garapan area, Saipan, Commonwealth of the Northern Mariana Islands.

U.S. Fish and Wildlife Service. 1995. Draft Fish and Wildlife Coordination Act Report, Micro Beach Shore Protection, Saipan, Commonwealth of the Northern Mariana Islands.

Van der Brug, O., 1985. Compilation of water resources development and hydrologic data of Saipan, Mariana Islands. Water Resources Investigation Report, 84-4121.

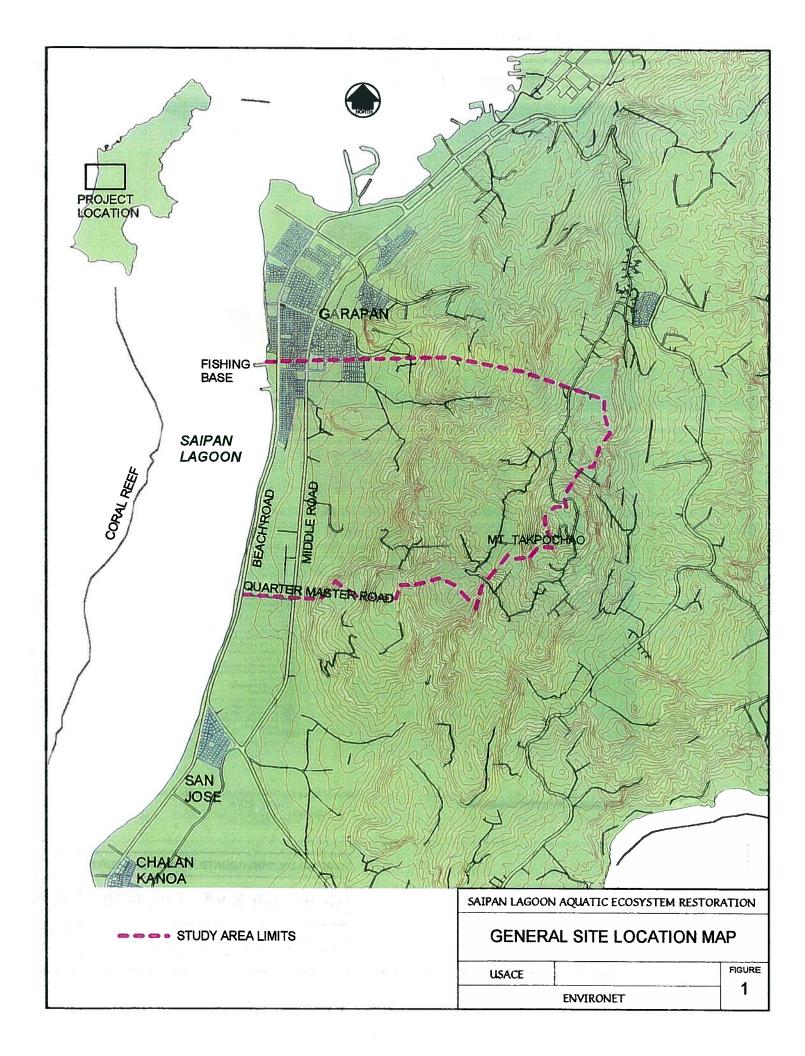
Western Pacific Regional Fishery Management Council. 1999. Fishery Management Plan for Coral Reef Ecosystems of the Western Pacific Regions (Vol. 1 & 2).

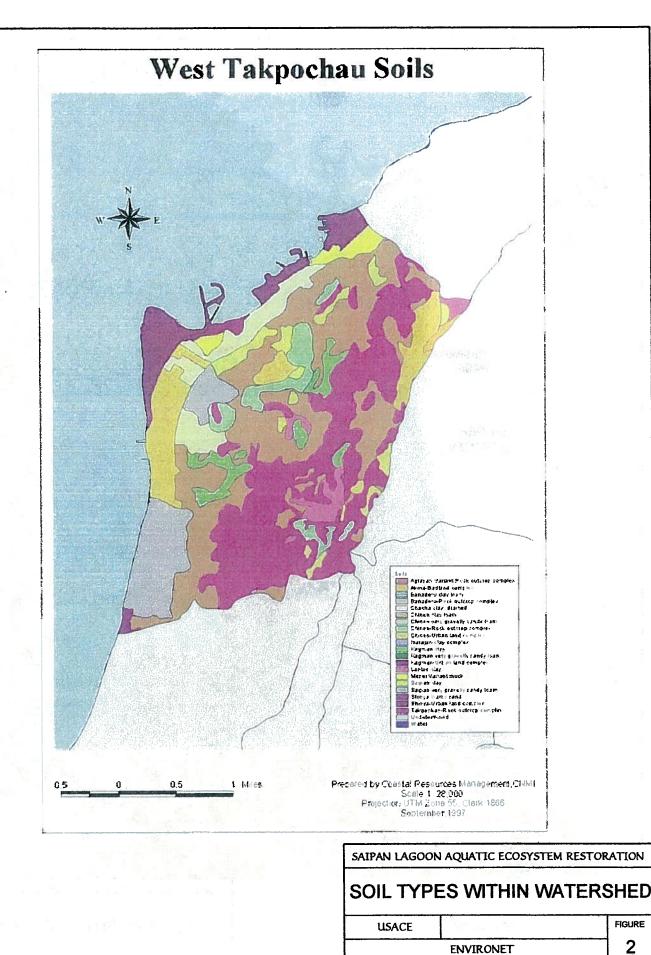
Zolan, W.J., 1981. Metal Concentrations in Guam Urban Runoff. Water and Energy Research Institute of the Western Pacific, Technical Report No. 25, 24 pp.

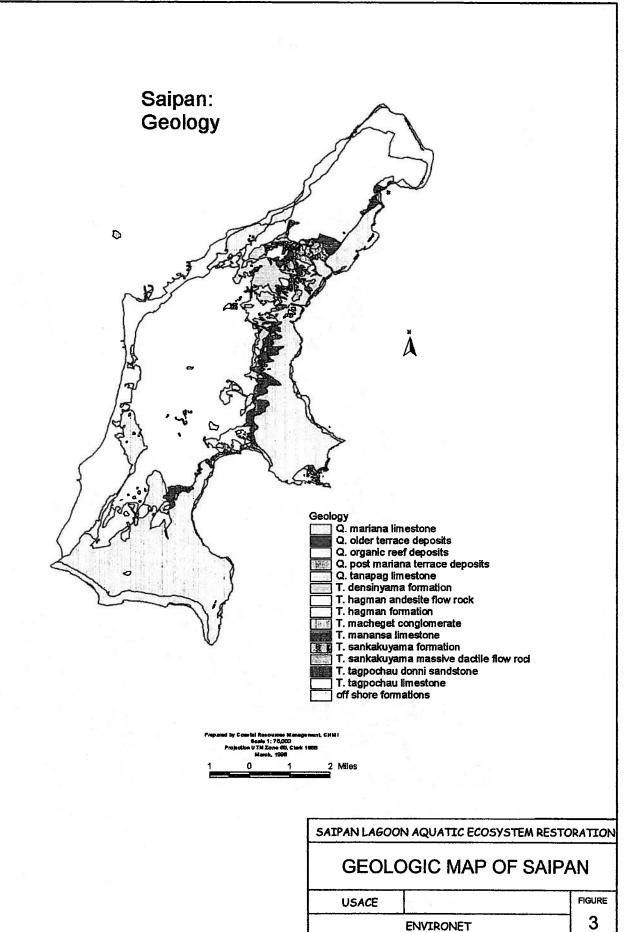
and the second of the second o

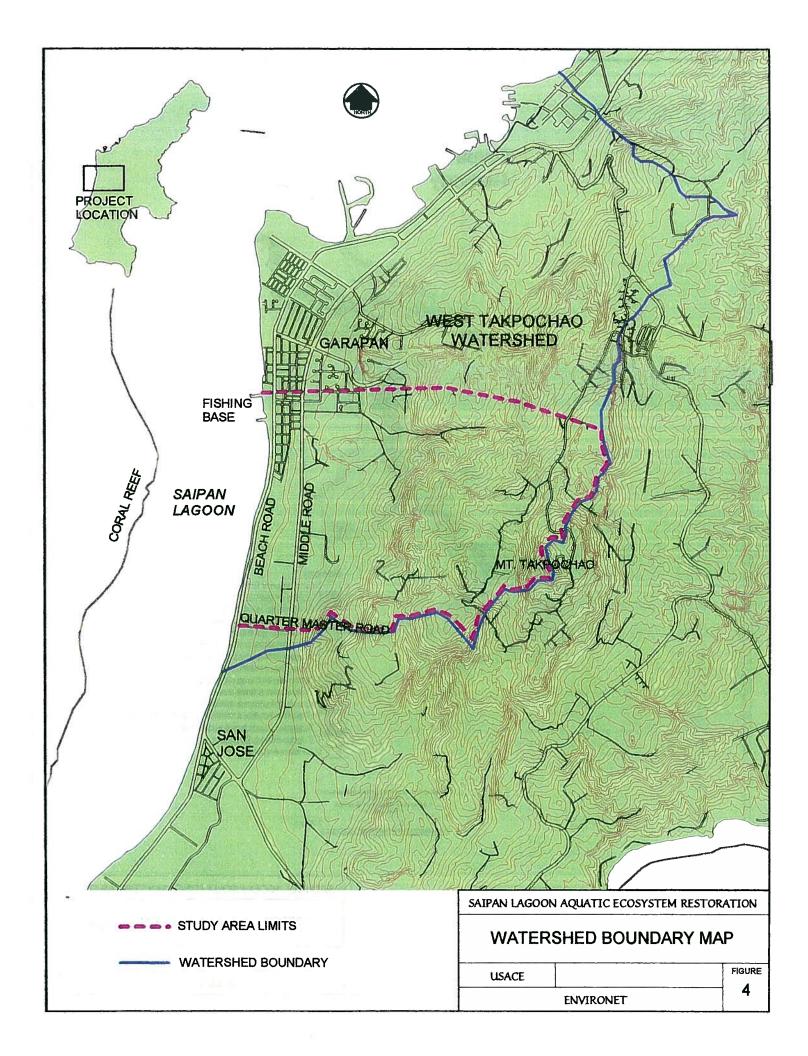
en a la gran de 1956 de septembre de la companya del companya del companya de la companya del companya de la companya de la companya del companya de la comp

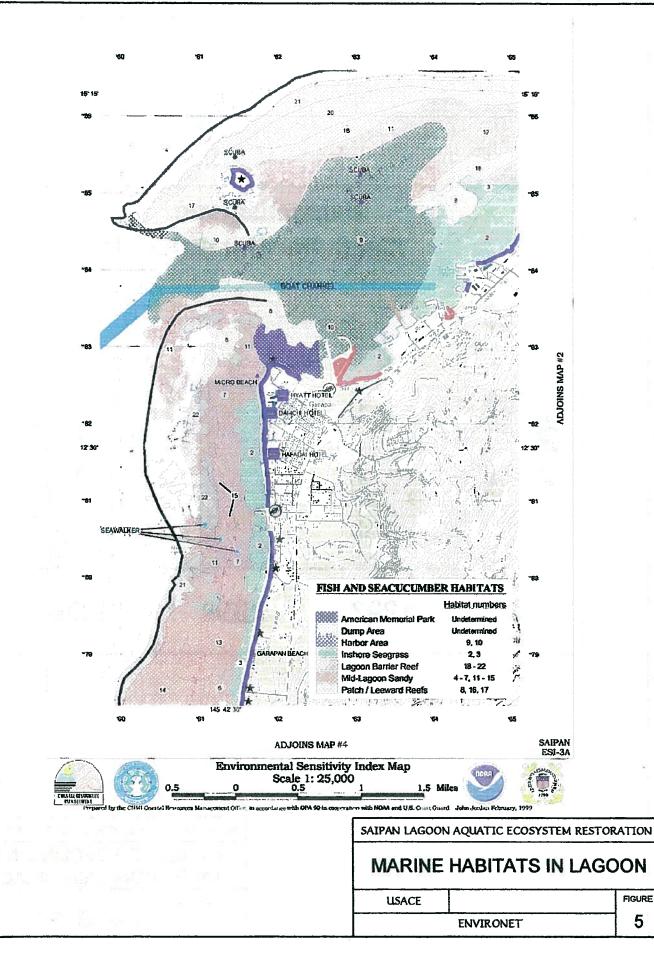
ng mining the state of the stat

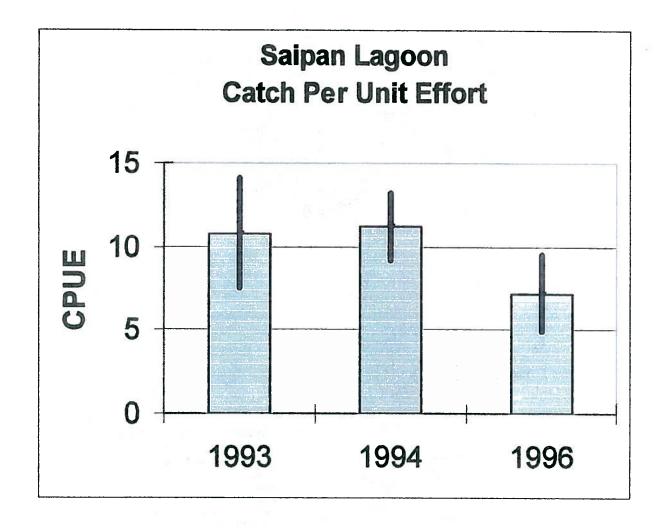




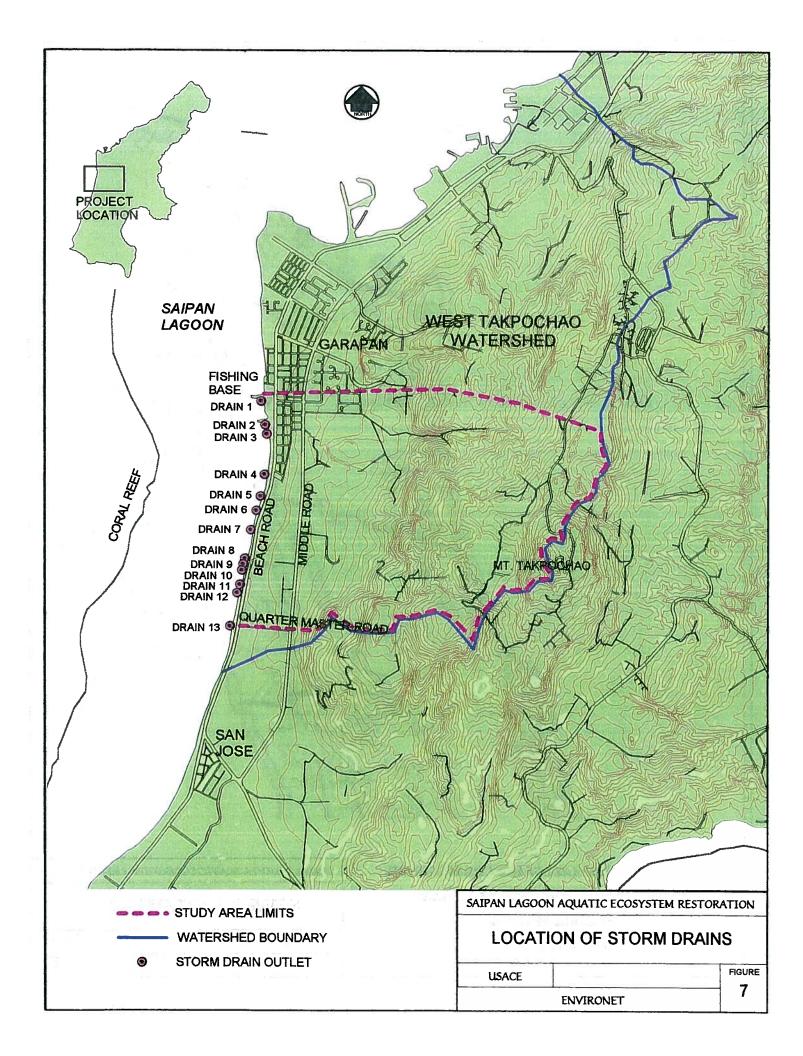








SAIPAN LAGOO	N AQUATIC ECOSYSTEM RESTOR	RATION
6	RED DECLINE IN FI	
USACE		FIGURE
	ENVIRONET	6

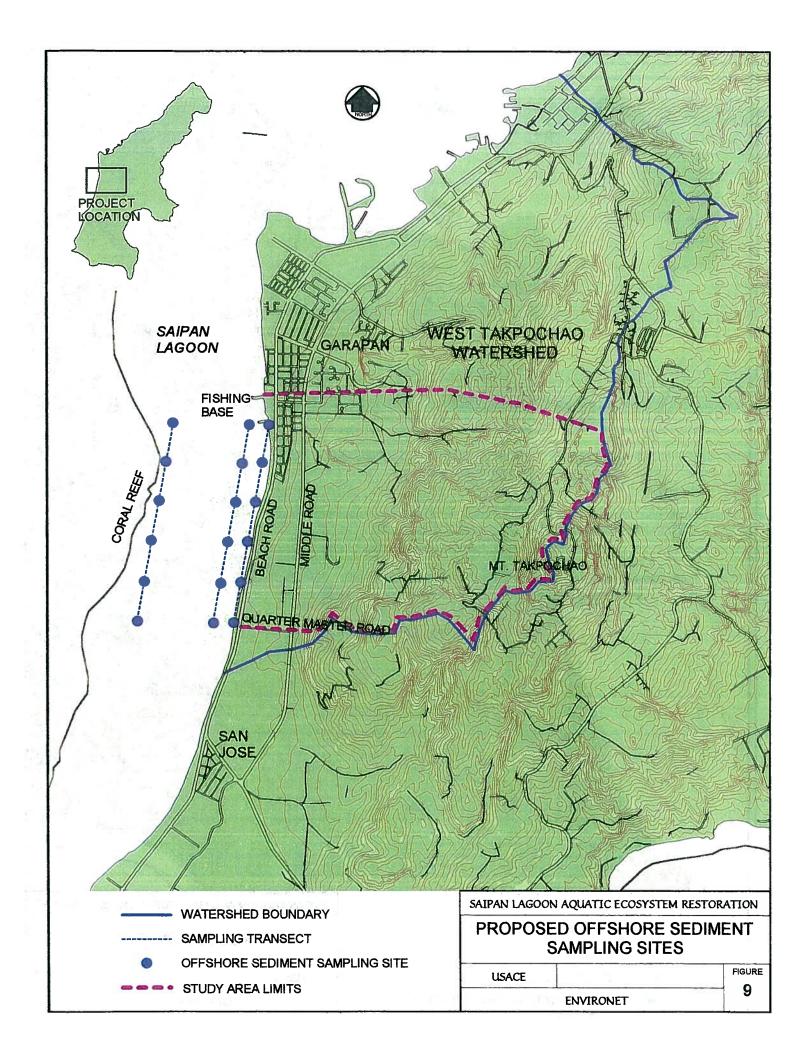


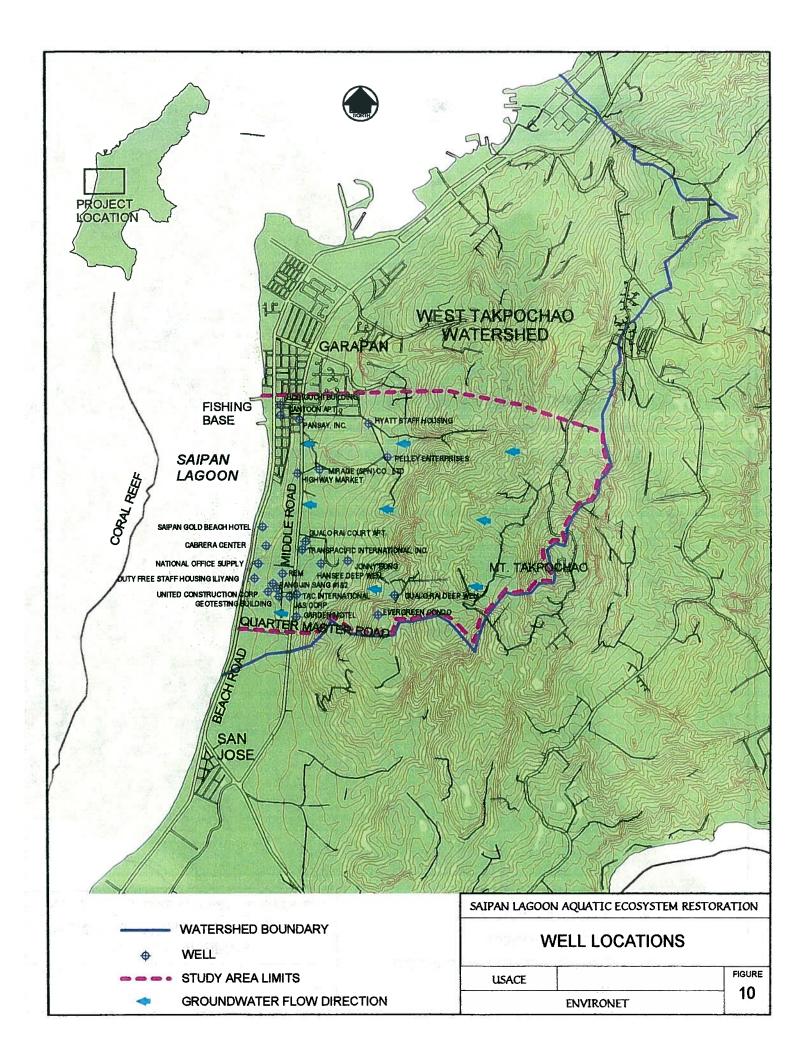


DIRECTION OF NEW TRUNK SEWERS
DIRECTION OF SEWAGE FLOW
EXISTING SEWERS
POWER LINES

SAIPAN LAGOON AQUATIC ECOSYSTEM RESTORATION
SEWER SYSTEM LAYOUT

USACE FIGURE ENVIRONET 8





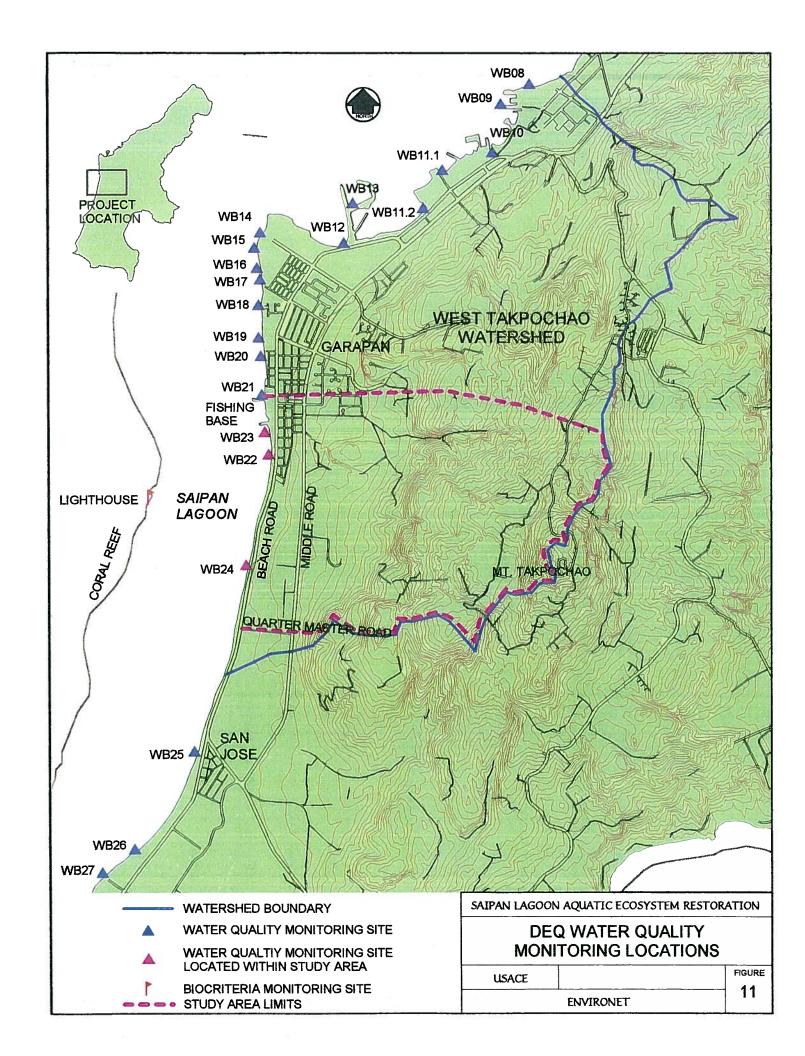


TABLE 1
LIST OF KNOWLEDGEABLE PEOPLE INTERVIEWED

NAME		ACENOV AND TITLE	DUONE	EMAII	NOTER	EAV
		MOENCI AND ITIES	מונים בי	E-WAIL.	NOIES	¥.
Dan	Nakamura	USACE, Project Manager				
Milton	Yoshimoto	USACE, Civil Works				
Lincoln	Gayagas	USACE, Civil Works	438 8862		UASCE on-site mgr	
Helen	Stedebean	USACE			Aerial Coastal Monitoring	
Peter	Barlas	CRM, Acting Director			Co-Sponser	
Jack	Salas	CRM, Chief Enforcement	234 6623			
Doug	Mauro	CRM			GIS / CAD	
John	Jordan	CRM				
Б	Babauta	CUC, Wastewater	235 6933			
Lorainne	Babauta	CUC, Wastewater				
Andy	Smith, P.E.	DPW, Tech Services Dir	322 9436		Co-Sponser	322-3547
Brian	Bearden	DEQ	664 8510	brian.bearden@saipan.com		
Clarrissa	Tanaka	DEQ, Chemist	664 8520	clarissa.tanaka@saipan.com	Water Quality Data	
Joe	Kaipat	DEQ	664 8509		Groundwater monitoring	
Peter	Houge	DEQ, Marine Fishery	664 8504			
Jeff	Schorr	Dept of the Interior				
Richard	Seman	DFW, Director	664 6000			
Kathryn	Miller	DFW, Permitting	664 8505		Resource planner, fisheries	
Mike	Trianni	DFW, Fisheries		mstdfw@itecnmi.com	Sea Cucumbers / survey info	
Kate	Moots	DFW, Fisheries officer		katemoots@Saipan.com		
Floyd	Masga	DFW, Fisheries Statistician	The second of the second			
Arnold	Palaciol	DLNR	322 9830		(Palacious) - ex-aquaculture	-
Kathy	Yuknavage	Health Services, Sanitation Dept.	664 4877	kathyy@gtepacifica.net		-
John	Tagabuel	Health Services, Sanitation Dept.		beh2@gtepacifica.net		
Susan	Burr	HI DOH			Data shoreline survey?	Lij
Ken	Kramer	NRCS	233 3415			
Tim	Brasuell	INRCS	233-3415			
Bill	Moran	INRCS	М			
Vince	Castro	DLNR	-	58 dpl@gtepacifica.net	GIS Atlas	288-3755
Robert	Carruth	NSGS				
Bruce	Hills	NSGS SECTION S	322 2060	bahill@saipan.com	1875	==
Vicky	Viligomez	현 그런 이 그룹은 이 이 이 이 이 이 이 이 이 이 이 이 이 이 이 이 이 이 이	100		Gov's Special Projects Office	
Tony	Peligrino	Sales and the sales of the sale	'.o.	89.	Citizen - Pizza owner / boat operator	
Deno	Jones	Congressman	664 8863			
Tom	Pangalenan	Congressman	664 8888			
Hines	Hopschnider	Congressman	664 6969			
Steve	Spengler	Environet	843 2319	mspengler@lava.net		843-2035
٥	Yamauchi	Environet	843 2319	ryamauch@lava.net		843-2035
Bob	Bourke	Oceanit	531-3017	rbourke@oceanit.com		531-3177

TABLE 2
WATER QUALITY MEASURED IN WELLS LOCATED WITHIN PROJECT WATERSHED

Well Name	Analysis Date	Chloride (mg/L)	TDS (mg/L)	Conductivity (umhos/cm)	Hardness	H	NO <sub>3</sub> (mg/L)
United Construction	Oct-99	6498	0006	15340	2480	6.7	2.7
Garden Motel	Apr-98	700	2130	2950	920	7.2	-3.7
Pang Jin Sang Sa	Mar-98	1899	4929	6650	1030	6.8	4.9
T. America	00-Inf	2599	5200	8780	1300	6.8	1
Geotesting	96-BnV	1799	2387	5770	1020	7.1	11
REM International	00-Inf	7998	13350	2100	3200	7.1	•
DFS Iliyang	00-Inf	8497	16350	24200	3200	7	1
Cantoon Apartments	Aug-97	4760	8980	15570	2690	7	4.1
Horiguchi Building —	Jul-00	6398	11950	19470	2440	- 2.5	-

ESTIMATED IMPORTANCE, COST AND DURATION OF RECOMMENDED STUDIES TABLE 3

RECOMMENEDED STUDY	RELATIVE IMPORTANCE OF STUDY RELATIVE COST OF STUDY "	RELATIVE COST OF STUDY "	ESTIMATED DURATION OF STUDY *2
Stormwater Ouality Investigation	HIGH	HOH	FONG
Analyze Lagoon Sediments for Physical and Chemical Parameters	HIGH	НВН	MEDIUM
Marine Habitat Mapping from Historical and Current Aerial Photographs	HÐIH	ТОМ	SHORT
Inshore Lagoon Area Sea Grass and Associated Fauna Survey	HJGH	нон	MEDIUM
Inventory of Potentially Contaminating Activities in Watershed	MEDIUM	ГОМ	SHORT
Hydrologic Study of Runoff Processes in Watershed	HIGH	НЭІН	PIONG
Groundwater Level Investigation in Watershed	MEDIUM	MEDIUM	MEDIUM
Lagoon Water Quality Investigation	MEDIUM	MEDIUM / HIGH"	, LONG
Sanitary Sewer Overflow Analysis for Project Area Collection Systems	HIGH	НІСН	TONG
Residence Time Study of Lagoon Water	MEDIUM	TOW	SHORT

<sup>&</sup>quot;Relative Cost Designations Based on the Following Ranges: Low = <\$20,000, Medium = >\$20,000 and <\$60,000, High = >\$60,000

Estimated Duration of Study Based on the Following Ranges: Short = < 1 month, Medium = > 1 month and < 4 months, Long > 4 months.

Gost of Study is Dependent on the Extent to which Personnel from the Department of Envioronmental Quality will be Involved in the Sampling and Analysis

Reviewer: Mr. Peter J. Barlas

Title: Coastal Resources Management Office

Date: January 19, 2001

Comment		
Number	Comment	Response to Comment
1	In general, the report is very well written and	Collection of some baseline data is required to allow
	accurately describes existing conditions, the	the effectiveness of implemented remedial technologies
	regulatory framework, previous environmental	to be evaluated quantitatively.
	investigations, existing baseline data and	Saipan DEQ personnel have tentatively agreed to assist
	restoration alternatives. However, I am	collecting much of the baseline data required for the
	concerned that several of the studies	Phase 2 study. This will allow a larger percentage of
	recommended to determine missing baseline	the project budget to be allocated toward the proposed
	data are highly technical, costly and may not	restoration work.
	be necessary to effectuate the restoration	*
	alternatives. As I agree it would be useful	1.07
	information, we may need to narrow the scope	3. 1
	of the baseline data collection to more specific	1 10 2 10
	parameters. If we focus too many resources in	O Ia - 011002 0.3
	this area it may bog down the study and effect	A STATE OF THE STA
	our ability to move to the restoration phase.	
2	My draft did not included Table 3 and this	Reviewer had a preliminary fax copy of the draft report
	may address this concern.	which did not include all of the tables and figures.
3	Lastly, I encourage the study to focus on the	Comment noted.
	infrastructure improvements as reliance on	
	stronger regulations and enforcement are less	
	likely to be effective alternatives in the CNMI.	

Reviewer: Mr. Antonio I. Deleon Guerrero

Title: Director, Commonwealth of the Northern Mariana Islands, Division of Environmental Quality

Date: March 21, 2001

Comment		
Number	Comment	Response to Comment
1	An Executive Summary should be provided at the beginning of this document, no more than 2 pages in length, which briefly states the findings on the suspected causes of lagoon degradation, and the recommendations for regulatory changes, infrastructure	We will add an executive summary to the report
71 11	improvements, watershed management, and additional studies necessary to refine these recommendations.	
2	Section 1.4 (Page 4, 3 <sup>rd</sup> paragraph) – This paragraph describes the definitions of Class A and AA waters in the CNMI, but there are some inconsistencies with the actual regulations that define these classifications. We suggest the following description for Class A and AA marine waters to be more consistent with the wording in our Water Quality Standards:	We will replace the paragraph with the exact wording taken out of the Water Quality Standards.
	The CNMI has designated two classes of marine waters; A and AA. Class AA represents high-quality waters that are considered to be in a "natural" and "pristine" state. The CNMI Water Quality Standards states that "to the extent practicable, the wilderness character of such areas shall be protected", and does not permit any discharge of pollutants in class AA waters. Class A waters have been designated in two parts of Saipan, and generally represent a slightly lower quality of water in which some discharges may be permitted, for example, the two sewage treatment plant outfalls on Saipan. Nevertheless, Class A waters must support recreational use and the propagation of fish, shellfish, and wildlife, and strict water quality standards have been set for the protection of these uses in Class A marine waters Additionally, further protection is afforded through the CNMI Anti-Degradation Policy, which is part of the Water Quality Standards and protects existing uses and water quality in any waters, despite their classification.	
3	Section 2.2 (Page 5, 3 <sup>rd</sup> para.) Beach Road is a two-lane, undivided highway.	We will revise the text.
4	Section 2.2.2 (Page 6, 3 <sup>rd</sup> para.) Add the following underlined word: "The site potentially receives runoff and sediments from the entire West Takpochao watershed"	We will revise the text.

Reviewer: Mr. Antonio I. Deleon Guerrero

Title: Director, Commonwealth of the Northern Mariana Islands, Division of Environmental Quality

Date: March 21, 2001

Comment	_	
Number	Comment	Response to Comment
5	Section 2.2.2 (Page 6, 3 <sup>rd</sup> para.) The end of this paragraph states "The Chinen-Urban Land Map unit in the lowlands between Middle Road and the Beach Road likely contributes the majority of sediments to the lagoon environment due to the disturbed nature of this soil unit." DEQ has observed that a large percentage of the sedimentation along the beach road drainages appears to come from quarried limestone backfill used for road and	Agree. We will revise the text to state that the Chinen-Urban Land Map unit contributes the majority of the sediment originating from erosion of the surface soils present in the area during heavy rainfall events. We will also add the observation about stockpiled backfill material providing a lot of the transported sediment.
	lot surfacing, and not so much from the	5 0 0 =
	underlying soils.	
6	Section 2.2.3 (Page 7, 1 <sup>st</sup> para.) "Damage to coral reef ecosystems can" Consider adding that toxic pollutants adsorbed to soil particles can also contribute to damage from sedimentation.	Agreed.
	"A shift in reef species toward more nutrient tolerant and less diverse communities" Consider adding that coral reefs with less diverse communities are also more susceptible to damage from natural disasters.	Agreed.
	"the apparent lack of adherence to Best Management Practices (BMPs) regulations at construction sites" DEQ administers the CNMI's Earthmoving and Erosion Control Permit program, which requires that all new	We will revise the text to reflect the ongoing efforts of DEQ to mitigate erosion problems associated with construction on the island.
	construction have an erosion control plan	1.6
	based on BMPs. While there may be occasional problems with implementation and inspection, and we do not question that the Corps' consultants may have observed this,	
	we respectfully request that this sentence be	Company of the same of
	re-worded to reflect that there are procedures	A <sup>(4)</sup> = 000 = 45
	and requirements in place, that DEQ performs	
	occasional site inspections for compliance, and therefore not a total "lack of adherence"	ox a solution of the
7	Section 2.2.6 (page 9, 2 <sup>nd</sup> para.) "algae species are abundant (more so nearshore) including" Add the following common	Agreed.
25	algae species : "Calurpa spp., Laurencia spp., and Acanthophora."	

Reviewer: Mr. Antonio I. Deleon Guerrero

Title: Director, Commonwealth of the Northern Mariana Islands, Division of Environmental Quality

Date: March 21, 2001

Comment		
Number	Comment	Response to Comment
8	Section 2.5 (Page 11, 3 <sup>rd</sup> para.) Another	We agree. The text will be revised accordingly.
	potentially contaminating activity we suggest	
	adding is sanitary sewer overflows, perhaps by	
	adding the following sentence:	
	"Additionally, the sewer collection system	
	within the project area along Middle Road is	
	known to overflow, and a major new	
	collection system nearing completion along	
	Beach Road will raise the potential for lagoon	0. 11 1. 4.1
	contamination from sanitary sewer overflows	and the second s
	(SSOs)."	
9	Section 2.6 (Page 12, 5th para.) "According to	We will revise the text.
	local personnel familiar with the system, the	277
	two main causes for SSOs" More than two	
	points are listed below this sentence.	
10	Section 2.7 (Page 13, last para.) "Land	Agreed. We will revise the text.
	ownership in Saipan is limited to citizens"	
	Land ownership in the CNMI is limited to	
	persons of indigenous origin only, not all U.S.	
	citizens.	
11	Section 3.4 (Page 17) - Also might want to	Agreed. We will add this to the text.
	clarify that the previous Garapan Flood	
	Control Project did not include the project	U ((1)) a
	area, and probably could not based on	
	topography.	11 1 2 2 4 4 4 4 4 4
12	Section 3.5 (page 18, 2 <sup>nd</sup> para.) "it is fortunate	Agreed.
	that the Government of Saipan" this	
	sentence should be changed to read as follows:	a 10 11
	"It is fortunate that the CNMI Government	
	and Division of Environmental Quality (DEQ)	1. 30
	has established through the CNMI Marine	ALCOHOL:
	Monitoring Team a program of regular reef	x garge o e e e
	monitoring surveys."	HERESER II E I
		K III III III III
	(3 <sup>rd</sup> para.) "An important biological indicator	We will revise the text.
	that is currently not monitored by DEQ"	ar ar and a minimage of the contract of
	Actually, DEQ has begun a nearshore	
	monitoring program, but this was not started	28
	until late 2000.	
13	Section 4.3 (Page 21, 2 <sup>nd</sup> para.) Delete "with"	Agreed.
	in first sentence: "they naturally change	306 11 11
	with over time"	(Fig. 1) State
14	Section 4.4 (Page 21, last para.) Change	Agreed. We will revise the text.
	reference to "Division of Aquatic Resources	
	Marine Monitoring Team" to "CNMI Marine	
	Monitoring Team".	
15	Section 4.5 (Page 22, 2 <sup>nd</sup> para.) Should	Yes. We will add this to the PCA inventory list.
2	sanitary sewer overflow points (lowest	,
	manholes, pump stations) also be listed in the	
	PCA inventory?	

Reviewer: Mr. Antonio I. Deleon Guerrero

Title: Director, Commonwealth of the Northern Mariana Islands, Division of Environmental Quality

Date: March 21, 2001

Comment		
Number	Comment	Personne to Comment
16	Section 4.7 (Page 23) We recommend using	Response to Comment The reason we suggested using Sugar Dock Pier was
10	the Fishing Base Pier as the lagoon water level	
	monitoring site since it is within the study	because a surveyed monitoring point already existed at this location.
	area, rather than the Sugar Dock Pier, which is	
	several miles south of the project area, and in	We will change the proposed monitoring location to the Fishing Base Pier in the revised text.
	a different lagoon environment, and may give	risining base riei in the levised text.
	different water levels.	
17	Section 5.1 (Page 27, 2 <sup>nd</sup> para.) Is the	?????
17	information regarding Phase II NPDES	MINI
	permitting correct? DEQ is under the	
	impression that MS4s for municipalities with	
	populations greater than 10,000 are now	a a sila saaran agi'a
	regulated, which would probably include	' k n sa n'
	Saipan. This should be verified.	N 78 * A SQL *
18	Section 5.1 (Page 27, last para.) "Specific	We will revise the text to include a discussion of the
	Regulatory measures" Existing	regulatory programs already in place on Saipan. We
	construction permit requirements do include	will refine our draft recommendations in light of these
	stormwater retention capacity – but this could	existing programs.
	probably be revised to be more current and	CAISING Programs.
	appropriate for Saipan. The DEQ	F1 1
i	Earthmoving and Erosion Control Permits	
	require "24 hour storage of 25-year, 24-hour	e a de la magazita judo
	storm; or 75% sediment removal rate" for both	6 8 8
	during-construction erosion control BMPs,	the first of the same
	and post-construction stormwater systems.	6
	DEQ agrees fully with the recommendations	r <sup>™</sup> is:
	listed here, however we want this document to	
	make it clear that there is already a program in	green to measure die.
	place that requires these things for all new	mean in court for the later one
	development, but may be in need of revision.	44.75.24
	These recommendations should be slightly	Min in time 1 d
	revised to reflect this, and to make sure some	
	credit is given to DEQ for attempting	
	implementation.	Prof. Prof. B. School Co.
19	Section 5.2 (Page 28) DEQ would like to see	Agreed.
	listed a recommendation for a BMP type that	
	can be installed within the existing Beach	
	Road easement, like Guam's San Vitores	Was Wall Land
	Road project, which placed a large	E 1035 2 TW
l	underground infiltration gallery beneath a	and the second s
	significant length of the road in this heavily	The second second section is a second
	developed coastal strip.	70 10 No - 100
20	Section 5.2 (Page 29, 2 <sup>nd</sup> para.) CUC has	Agreed.
	already added level sensors and bar screens at	M 7 K N N N N T T E
	all lift stations, but maintenance (cleaning) of	
	the bar screens is sometimes a problem.	
	Consider also recommending improving	
	maintenance of lift stations.	

Reviewer: Mr. Antonio I. Deleon Guerrero

Title: Director, Commonwealth of the Northern Mariana Islands, Division of Environmental Quality

Date: March 21, 2001

Comment		
Number	Comment	Response to Comment
21	Section 5.2 (Page 29, 4 <sup>th</sup> para.) Infrastructure projects may require a Section 401 WQC, but not necessarily. A WQC is only issued when there is a corresponding federal permit for an activity that may result in water quality degradation. All construction projects, however, will require a DEQ Earthmoving and Erosion Control Permit, which contains the stormwater quality requirements mentioned above.	We will revise the text to reflect the reviewers comments.
22	Finally, based on our discussions with your office, the Corps, and their contractor, the following additional studies are recommended as the minimum required to complete Phase II of this study:	Agreed. We will revise the text to reflect these arrangements that were negotiated after submittal of the draft report.
	Stormwater Quality Investigation     primary responsibility: Corps     assistance: DEQ may assist with some     sample taking	
	2. Analyze Lagoon Sediments for Physical and Chemical Parameters primary responsibility: Corps assistance: DEQ will perform sample taking	
	3. Marine Habitat Mapping from Historical and Current Aerial Photographs primary responsibility: Corps	The state of the s
	4. Inshore Lagoon Area Sea Grass and Associated Fauna Survey primary responsibility: DEQ	
	5. Inventory of Potentially Contaminating Activities in Watershed primary responsibility: Corps	
	6. Hydrologic Study of Runoff Processes in Watershed primary responsibility: Corps assistance: DEQ will provide field runoff observations	

Reviewer: Mr. Antonio I. Deleon Guerrero

Title: Director, Commonwealth of the Northern Mariana Islands, Division of Environmental Quality

Date: March 21, 2001

Comment		
Number	Comment	Response to Comment
23	The remaining studies, while important, are not critical (in DEQ's opinion) to completing	Agreed. We will revise the text to reflect the decisions that arose out of Saipan officials review of the draft
	Phase II:	document.
	Sanitary Sewer Overflow Analysis     for Project Area Collection Systems     Groundwater Level Investigation in	
	Watershed	n on gran
	3. Lagoon Water Quality Investigation	
	Residence Time Study of Lagoon Water	

Reviewer: Stan Good

Title: Department of Public Works

Date: March 20, 2001

Comment		
Number	Comment	Response to Comment
1	Section 2, Part 2.2.2: The study area is the western coastal area of Saipan from Garapan to roughly Chalan Kanoa. The report states the project area receives runoff from the entire west Takpochao watershed which extends roughly 3.5 miles inland. This is a gross overstatement. Mt. Takpochao is only about 2 miles inland from the western coast and the island is barely 3.5 miles wide in this location. There are certainly localized drainage channels which find their way to the sea, but their run in not over a mile. Also, in this same section it is mentioned the soils are uniformly varying from the coast to the uplands. From our experience there are pockets of eroded sediments, clayey areas and karst throughout the area from the coastal area to the uplands. While general soil profiles can describe an	We will revise the text to specifically talk about the watershed area that contributes runoff to only the project area, which extends from Quartermaster Road to the Fishing Base. We will also add a comment about the small scale heterogeneity in soil types present throughout the watershed.
	area, within the area the soils can vary widely.	
2	2.2.3: Soil Erosion: In my opinion significant soil erosion is from unpaved secondary road, unprotected building sites, and recently cleared or burned areas.	Agreed.
3	2.4: In contrast to their statement I would consider the eastern side of Beach Road to be densely developed, not characterized by "a few houses present along the few dirt and paved roads that cross between the two main roads" referring to the area between Beach Road and Middle Road.	The comment in the text was meant to refer to the overall area located between Beach and Middle road which is one of the less developed areas along the western coastal plain of Saipan.
4	2.5: This section states the variety of development in the area and contradicts the area previously mentioned as sparsely developed.	We will make the text consistent regarding the density of development in the area.
5	2.6: This section is in contrast to Section 2.2.2 and states that the tributaries for the storm drains "were not delineated during the site visit". Why not, it is not so hard to walk up a drainage channel? The section also states that drainage from "upland areas of Middle Road were not delineated or quantitated during the site visit". And in addition, "there seems to be no connection between storm drains on the upper road and those on the lower road". This is simply not true. The report says ponding prevails after a heavy rainfall and only a small fraction of the Middle Road runoff reaches Beach Road. Obviously, they have never experienced a heavy rainfall and seen the raging rivers crossing Middle Road on their	The purpose of the recomnaissance field visit was to simply identify the relevant issues that require additional study.  Based on our limited observation of runoff after heavy rainfall within the project area, significant amounts of runoff are generated in the vicinity of Middle road, which ultimately flows towards the downhill, ocean side of the road. However, much of this runoff appears to infiltrate within the developed and undeveloped land areas located between Middle road and Beach road prior to reaching the lagoon.

Reviewer: Stan Good

Title: Department of Public Works

Date: March 20, 2001

Comment Number	Comment	Response to Comment
14	5.2: Good ideas! But where is the septic system mitigation?	Will add a discussion of septic system mitigation to the text.
- 15	In the table of important and knowledgeable people contacted John Gourley was not mentioned. They shows photos from his work on the cover of their report and did not refer to him at all.	We did not meet Mr. Gourley during our reconnaissance visit to the island. We will make a point of talking with him during the Phase 2 portion of the project.

Document: Draft Phase 1, Saipan Lagoon, Aquatic Ecosystem Restoration Project Reviewer: Miscellaneous

Date: January 2001

Comment	_	
Number	Comment	Response to Comment
1	Some discussion or depiction of overall study schedule, construction schedule, or	The details of the future project schedule are outside the control of the contractor. We will include a the
<del> </del>	management implementation timelines is appropriate.	projected end date for the project in the report.
2	Maps with the project area delineated would focus attention on the impacted areas (i.e. soils, land use, etc). May be difficult with the scale of the figures provided.	We will revise Figure 1 in the draft report to include an outline of the project area.
3	Photos (where available) would give the reader better understanding of the written descriptions.	We will include some photos of the project area in the appendix of the final report.
4	For the preliminary alternatives-provide priority for implementation, a rough order of magnitude estimate, and an example sketch, photo or figure where appropriate.	Estimated cost information for the preliminary alternatives is provided in Table 3 of the draft report.
5	The new sewer along Beach Road may be a force main rather than gravity line as described in the report.	We will revise the text.
6	Is there any multispectral imagery available?	We have been unable to locate any.
7	The population estimate for the year 2000 does not look correct.	We will check the value listed in the draft report.
8	It is a bit difficult for me to believe that U.S. Government Aide is related to the increase of island population during the 1980'sIs there a citation you can use?	We will remove this statement in the final report.
9	I don't understand the relevance of discussing all the toxicity data from the Puerto Rico dump. The contaminants of the 50-year open dump is not at all related to the storm water drains of south Garapan.	The sediment data collected from offshore the Puerto Rico dump will be compared with levels detected in sediments collected from within the project area lagoon.
10	Word of caution: The 60% loss of wetlands quoted by the DEQ is an unsubstantiated statement which was also included in the previous years (1998) 305(b) report. I have no idea where they obtained the estimate	We will add the 1998 reference to the text in addition to the DEQ, 1999 reference cited.
11	You may wish to discuss the distribution of flood plains as described by FEMA in their FIRM maps (Community Panel #750001 0011B) which were published in 1991.	We will attempt to find copies of these maps for the project area and describe the portions of the project area that are prone to flooding.
12	I believe the stormwater drainage system presently under discussion is covered somehow by a USEPA 402 general permit. I know the DEQ issued a Section 401 WQC for the stormwater drains in 1997(?). I used to have a copy of the DEQ Section 401 WQC but was not able to find it to FAX to you. I believe Mike Lee or Pat Young (USEPA) may be able to obtain a copy for you.	I will e-mail Pat Young to see if she has a copy of this document.

Appendix C
Baseline Monitoring Studies

C.1
Stormwater Quality Investigation

### **APPENDIX C.1**

## STORMWATER QUALITY INVESTIGATION

Stormwater runoff samples were collected from storm drains 4, 6, 11, and 13 located along the shoreline within the study area, Drain 14 located south of the study area, and the Dai Ichi Hotel and Hafa Adai Hotel located north of the study area (Figure C.1). These particular storm drains or drainage areas were chosen for several reasons:

- Drains 4, 6, and 11 typically have a high volume of runoff during rain events, and even flow during small rain events, providing consistent sediment transport to the lagoon. They are also spatially located to provide comprehensive coverage of the study area.
- Drain 13 was chosen because it is located at the intersection of Quartermaster Road and Beach Road. This location provides lateral coverage of the study area and allows for runoff variance between Middle and Quartermaster Roads. This location was only sampled once.
- Drain 14 is located south of the study area in the vicinity of Lake Susupe and its associated wetlands. This location was sampled twice in an effort to determine if the presence of a natural wetland (Lake Susupe) would reduce the sediment/nutrient load transported by stormwater discharge.
- The Dai Ichi Hotel and the Hafa Adai Hotel are located north of the study area. These two locations were each sampled twice to establish potential sediment/nutrient load adjacent to the study area.

Table C.1 provides stormwater discharge volume measurements collected in 2002 from the selected drain locations.

**Table C.1: Discrete Stormwater Discharge Volumes** 

Date	Drain 4 (gpm)	Drain 6 (gpm)	Drain 11 (gpm)	Drain 13 (gpm)	Drain 14 (gpm)		
2/13/02	NS	3	30	NS	30		
5/9/02	NS	1200-1500	200	10	NS		
7/1/02	106	40	15	NS	NS		
7/29/02	5	20	20	NS	NS		
8/12/02	428	1000	150	12	NS		
9/20/02	60	1200	NS	600	NS		

NS = not sampled

gpm = gallons per minute

Flow volumes at each drain vary greatly due to several factors. During small rain events, the amount of rainfall within the watershed determines how much rain affects each drain. For example, it may have rained harder at the northern end of the study area than at the southern end, resulting in more flow at northern drains. Also, the topography of the contributory areas for each drain differs, affecting both the time of concentration and the volume of flow to each drain.

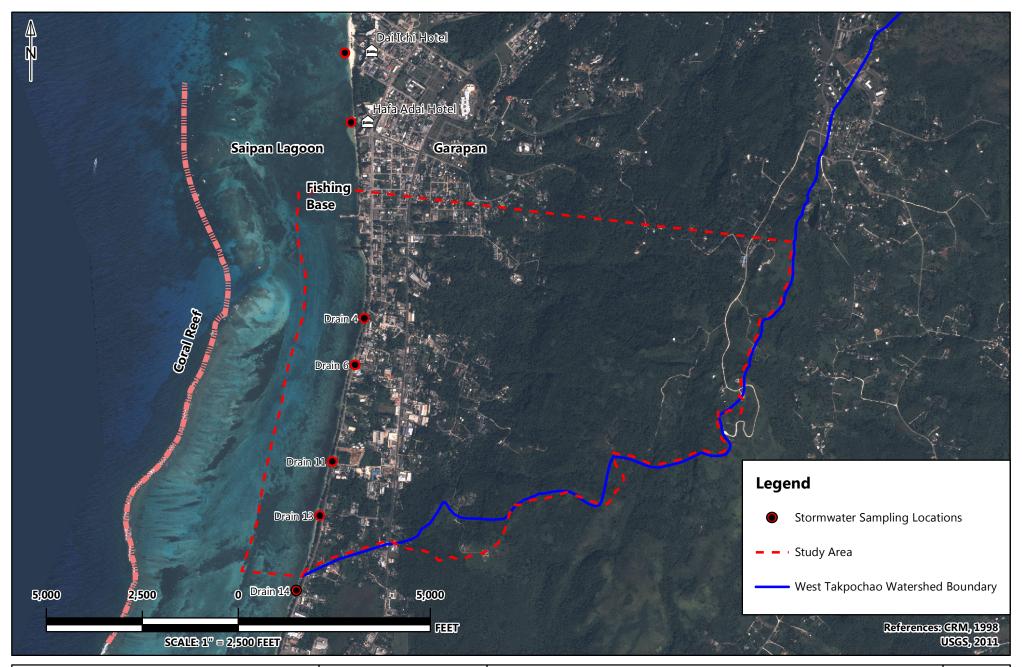
Typically, the initial surface runoff water is the most heavily contaminated during a rain event simply because it transports contaminants that may be present on the ground surface down-slope. An effort was made to collect the runoff samples during the initial flush of the rain events listed above in order to try to capture the most contaminant–laden runoff water. The runoff samples were shipped to Sequoia Analytical Laboratories in Petaluma, California to be analyzed for priority pollutant metals. The complete laboratory analytical reports from these analyses are included at the end of this report. Results are presented in Table C.2.

The runoff sample results were compared against the United States Environmental Protection Agency (EPA) national recommended water quality standards for priority pollutants (EPA, 2009), both chronic and acute toxicity values for the freshwater aquatic life criteria:

- Runoff samples from Drain 4 consistently exceeded the standards for cadmium, copper, lead, and zinc. Selenium was detected at a concentration exceeding the chronic toxicity standard in one of the four samples collected from Drain 4.
- Runoff samples from Drain 6 consistently exceeded the standards for copper. In addition, cadmium and lead were detected at concentrations exceeding the standards in five of seven samples collected from Drain 6. Zinc was detected once at a concentration exceeding the acute toxicity criteria at Drain 6.
- Runoff samples from Drain 11 consistently exceeded the standards for copper. In addition, cadmium and lead were detected at concentrations exceeding the standards in five of six samples collected from Drain 11. Zinc was detected three times at a concentration exceeding the acute toxicity criteria at Drain 11. Nickel was detected once at a concentration exceeding the chronic toxicity criteria at Drain 11.

None of the metals were detected at concentrations exceeding the standards in the single sample collected at Drain 13.

- Zinc was detected at a concentration exceeding the acute toxicity criteria in both samples collected at Drain 14. Copper was detected once at a concentration exceeding the acute toxicity criteria at Drain 14. Cadmium was detected once at a concentration exceeding the chronic toxicity criteria at Drain 14.
- Cadmium and selenium were detected at concentrations exceeding the chronic toxicity criteria in both of the samples collected at the Dai Ichi Hotel. Copper and zinc were detected at concentrations exceeding the acute toxicity criteria in one of the two samples collected at the Dai Ichi Hotel.
- Cadmium and copper were detected at concentrations exceeding the standards in both of the samples collected at the Hafa Adai Hotel. Lead was detected once at a concentration exceeding the chronic toxicity standard at the Hafa Adai Hotel.





PROJECT NO.: 1057	ECOSYSTEM RESTORATION REPORT	
DATE: SEPTEMBER 20, 2012	SAIPAN LAGOON AQUATIC ECOSYSTEM RESTORATION STUDY	FIGURE
DRAWN BY: CB	STORMWATER SAMPLING LOCATIONS	C.1
REVIEWED BY: MA	SAIPAN, CNMI	

Table C.2: Stormwater Runoff Metals Analytical Summary, 2002

Sample Location	Date Collected	Units	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
EPA National	Acute Toxicity	μg/L	NL	340	NL	NL	2	570	$13^2$	65	1.4	470	NL	3.2	NL	120
Recommended Water Quality Criteria <sup>1</sup>	Chronic Toxicity	μg/L	NL	150	NL	NL	0.25	74	9 <sup>2</sup>	2.5	0.77	52	5	NL	NL	120
	7/29/2002	μg/L	3.3J	9.6	34	4U	2.5	44	43	18	0.062J	29	2.6J	0.21J	2U	230
Drain 4	8/12/2002	μg/L	2.3J	12	60	4U	1.1	41	49	9.3	0.017J	40	4.3J	1U	2U	160
Diam 4	10/7/2002	μg/L	2.2J	5U	27	4U	2.1	17	33	15	0.048	15	2.4J	1U	2U	170
	12/4/2002	μg/L	3.3J	11	74	4U	5.2	40	57	36	0.15J	51	6.1	1U	0.44J	290
	2/13/2002	μg/L	60U	100U	NA	0.35J	10U	2.4J	15	75U	0.2U	30U	100U	<b>7</b> U	100U	48
	5/9/2002	μg/L	60U	100U	NA	0.13J	10U	14	18	15J	0.2U	11J	100U	7U	100U	66
	7/29/2002	μg/L	1.1J	3.9J	11	4U	0.39J	10	11	2.4J	0.013J	4.9J	5U	0.2J	0.23J	75
Drain 6	8/12/2002	μg/L	1.5J	3.8J	23	4U	0.83	13	23	8.6	0.039J	8.2J	2.2J	0.17J	2U	130
	8/12/2002	μg/L	1.4J	2.9J	12	4U	0.83	20	16	3.2	0.01J	5.3J	5U	1U	2U	110
	10/7/2002	μg/L	1.2J	5U	17	4U	1.3	2.7J	18	8.9	0.017J	6.4J	3.6J	1U	2U	100
	12/4/2002	μg/L	1.2J	5U	14	4U	1.2	2J	11	4	0.015J	4.5J	5U	1U	2U	64
	2/13/2002	μg/L	60U	100U	NA	0.45J	3.7J	26	95	53J	0.008J	14J	100U	<b>7</b> U	100U	250
	5/9/2002	μg/L	60U	100U	NA	1U	10U	6.9J	24	23J	0.2U	30U	100U	<b>7</b> U	100U	59
Drain 11	7/29/2002	μg/L	1.2J	2J	11	4U	0.53	21	12	1.7J	0.2U	7.6J	1.5J	0.2J	2U	100
Diam 11	8/12/2002	μg/L	5.8	12	42	4U	1.6	41	94	44	0.026J	120	4.4J	1U	2U	240
	8/12/2002	μg/L	6	11	34	4U	1.8	47	87	58	0.041J	35	1.9J	1U	2U	330
	10/7/2002	μg/L	4.6J	5U	26	4U	2.2	28	71	40	0.026J	14	5U	1U	2U	160
Drain 13	5/9/2002	μg/L	60U	100U	NA	1U	10U	10U	4.4J	75U	0.2U	30U	100U	7U	100U	42
Drain 14	2/13/2002	μg/L	60U	100U	NA	0.35J	10U	6.3J	19	75U	0.013J	30U	100U	7U	100U	120
Diam 14	8/12/2002	μg/L	1.2J	5U	8J	4U	0.48J	15	6.2J	1.1J	0.2U	7.6J	5U	1U	2U	140
Dai Ichi Hotel	8/12/2002	μg/L	1.8J	11	8.4J	4U	0.48J	17	8.9J	3U	0.015J	11	14	1U	2U	150
Dui icili iiotei	12/4/2002	μg/L	0.93J	110	14	4U	0.67	10U	22	0.95J	0.02J	31	130	1U	2U	82
Hafa Adai Hotel	7/29/2002	μg/L	1.3J	2.6J	12	4U	0.54	19	13	5.9	0.013J	7J	5U	1U	2U	94
Hara Adai Hotel	12/4/2002	μg/L	0.85J	91	11	4U	1.1	10U	14	0.69J	0.2U	27	5U	1U	2U	69

### Notes:

NA = not analyzed

NL = not listed

 $\mu g/L = micrograms per liter$ 

meets or exceeds the EPA water quality standard for acute and chronic toxicity standards meets or exceeds the EPA water quality standard for chronic toxicity standards

<sup>&</sup>lt;sup>1</sup>EPA national recommended water quality criteria for priority pollutants, freshwater aquatic life criteria (EPA, 2009).

<sup>&</sup>lt;sup>2</sup>Based on the CNMI water quality criteria for priority toxic pollutants, freshwater aquatic life criteria (DEQ, 2002).

<sup>- &</sup>quot;U" indicates that the analyte was not detected at or above the reporting limit.

<sup>- &</sup>quot;J" indicates estimated value.

Some of the metals were detected at a higher concentration during times when the measured stormwater discharge was higher. This may be an indication that metals that are deposited on the ground surface from anthropogenic sources such as motor vehicles and industrial activities are washed into the lagoon via stormwater runoff during large rainfall events. However, runoff sample exceedances occurred during both the dry and wet season, and the result is not consistent enough to conclude that more metals are carried into the lagoon during larger rainfall events. It may be safer to conclude that the amount of metals that are carried into the lagoon via stormwater runoff depends on the source of contamination (from pervious or impervious surfaces) and the relative timing of the rain event. Stormwater runoffs during early season rains or after a dry period usually contain the highest pollutant concentration due to the amount of time that has allowed pollutants to be deposited and accumulate on impervious surfaces. Pollutants from pervious surfaces on the other hand may be found at a constant rate regardless of the timing of the rain event. Additional data may be required to determine the source of metal pollutants that are washed into the lagoon via stormwater runoff (no additional stormwater data has been collected since 2002). Since this study proposes a solution that will capture contaminated stormwater regardless of the source of metal pollutants, additional study is considered outside the scope of this study.

### REFERENCES

- EPA, 2009. *National Recommended Water Quality Criteria*. Office of Water, Office of Science and Technology. <a href="http://water.epa.gov/scitech/swguidance/standards/current/index.cfm">http://water.epa.gov/scitech/swguidance/standards/current/index.cfm</a>>
- DEQ, 2002. CNMI Water Quality Standards. Promulgated in accordance with the *Commonwealth Environmental Protection Act, (CEPA),* 1982, 2 CMC §§3101 to 3134, Public Law 3-23; the *Commonwealth Environmental Amendments Act,* 1999, Public Law 11-103; and the *Commonwealth Groundwater Management and Protection Act,* 1988, 2 CMC §§3311 to 3333, Public Law 6-12, of the Commonwealth of the Northern Mariana Islands, and under the provisions of the Clean Water Act, P.L. 92-500 (33 U.S.C. 1251 et. seq.).

July 12, 2002

Matt Neal Environet, Inc. 2850 Paa Street, Suite 212 Honolulu, HI 96819 RE: Saipan AES / P202349

Enclosed are the results of analyses for samples received by the laboratory on 02/20/02. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Angelee Cari Project Manager

CA ELAP Certificate Number 2374

Project: Saipan AES
Project Number: [none]
Project Manager: Matt Neal

P202349
Reported:
07/12/02 13:25

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
F01009SW11-0.0	P202349-01	Water	02/13/02 20:15	02/20/02 09:35
F01009SW06-0.0	P202349-02	Water	02/13/02 20:25	02/20/02 09:35
F01009SW14-0.0	P202349-03	Water	02/13/02 20:30	02/20/02 09:35

Project: Saipan AES
Project Number: [none]
Project Manager: Matt Neal

P202349
Reported:
07/12/02 13:25

# Total Metals by EPA 6000/7000 Series Methods Sequoia Analytical - Petaluma

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009SW11-0.0 (P202349-01) Water	Sampl	ed: 02/13/02	20:15 Rec	eived: 02	2/20/02 09:	:35	1			Ü
Mercury	0.0080	0.0070	0.20	ug/l	1	2020481	03/01/02	03/04/02	EPA 7470A	
Antimony	ND	16	60	11	н	2020487	03/04/02	03/05/02	EPA 6010B	•
Arsenic	ND	22	100	n	•	п	n	11	4	
Beryllium	0.45	0.11	1.0	11	"	Ħ	19	11	n	J
Cadmium	3.7	3.6	10	n	n	11	"	"	"	J
Chromium	26	2.2	10	11	"	**	II	н	**	•
Copper	95	2.2	10	11	"	11	11	*1	п	
Lead	53	13	75	п	n	**	**	**	11	J
Nickel	14	11	30	*1	n n	**	п	H	11	- J
Selenium	ND	39	100	н	"	n	n	u	ŧi	•
Silver	ND	1.5	7.0	н	"	n	n	"	11	
Thallium	ND	21	100	**	Ħ	11	·	"	11	
Zinc	250	12	20	11	**	*1	u	11	н	
F01009SW06-0.0 (P202349-02) Water	Sample	ed: 02/13/02	20:25 Rec	eived: 02	2/20/02 09:	35				
Mercury	ND	0.0070	0.20	ug/l	1	2020481	03/01/02	03/04/02	EPA 7470A	
Antimony	ND	16	60	"	**	2020487	03/04/02	03/05/02	EPA 6010B	
Arsenic	ND	22	100	"	н	11	11	11	"	
Beryllium	0.35	0.11	1.0	*1		"	u	11	"	J
Cadmium	ND	3.6	10	n		H	u	**	**	-
Chromium	2.4	2.2	10	19	11	11	**	н		J
Copper	15	2.2	10	11	"	n	**	n	п	•
Lead	ND	13	75	н	**	*1	п	**	"	
Nickel	ND	11	30	*1	"	n	**	**	**	
Selenium	ND	39	100	**	n	11	"	н	п	
Silver	ND	1.5	7.0	н	11	"	"	11	n	
Thallium	ND	21	100	н	**	**	11		n	
Zinc	48	12	20	11		11	,,	11	"	

Project: Saipan AES
Project Number: [none]
Project Manager: Matt Neal

P202349
Reported:
07/12/02 13:25

# Total Metals by EPA 6000/7000 Series Methods Sequoia Analytical - Petaluma

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009SW14-0.0 (P202349-03) Water	Sample	ed: 02/13/02	20:30 Rec	eived: 0	2/20/02 09:	35	196	23		ja <sup>al</sup>
Mercury	0.013	0.0070	0.20	ug/l	1	2020481	03/01/02	03/04/02	EPA 7470A	J
Antimony	ND	16	60	и	n 🔠	2020487	03/04/02	03/05/02	EPA 6010B	
Arsenic	ND	22	100	**	Ħ	11	**	**	н	
Beryllium	0.35	0.11	1.0	H =	11	11	n		11	ī
Cadmium	ND	3.6	10	11	**		e #	"	"	88
Chromium	6.3	2.2	10	11	u	"	Ħ	*1	п	E Y
Copper	19	2.2	10	**	11	ti	ei .	11	н	•
Lead	ND	13	75	ч	н	11	"	"	11	
Nickel	ND	11	30	н		11	, i n	"	**	
Selenium	ND	39	100	ti	**	**	**	"		
Silver	ND	1.5	7.0	n	**	**	п			
<b>Fhallium</b>	ND	21	100	11	**	tt	11	n	n	
Zinc	120	12	20		n	**	"	11	ti	

Project: Saipan AES
Project Number: [none]
Project Manager: Matt Neal

P202349 Reported: 07/12/02 13:25

# Total Metals by EPA 6000/7000 Series Methods - Quality Control Sequoia Analytical - Petaluma

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC	RPD	RPD Limit	Notes
Batch 2020481 - EPA 7470A	·							- Danies		Dillin	140(68
Blank (2020481-BLK1)	<del></del>			•	Prepared:	03/01/02	Analyzed	l: 03/04/02			
Mercury	ND	0.0070	0.20	ug/l							
Laboratory Control Sample (202048	81-BS1)				Prepared:	03/01/02	Analyzed	: 03/04/02			
Mercury	1.57	0.0070	0.20	ug/l	1.60		98	80-120			
Matrix Spike (2020481-MS1)		Source	: P202320-	02	Prepared:	03/01/02	Analyzed	: 03/04/02			
Mercury	1.39	0.0070	0.20	ug/l	1.60	0.013	86	75-125			
Matrix Spike (2020481-MS2)		Source	: P202354-	01	Prepared:	03/01/02	Analyzed	: 03/04/02			
Mercury	1.44	0.0070	0.20	ug/l	1.60	ND	90	75-125			
Matrix Spike Dup (2020481-MSD1)		Source	: P202320-	02	Prepared:	03/01/02	Analyzed	: 03/04/02			
Mercury	1.43	0.0070	0.20	ug/l	1.60	0.013	89	75-125	3	20	
Matrix Spike Dup (2020481-MSD2)		Source	: P202354-	01	Prepared:	03/01/02	Analyzed	: 03/04/02			
Mercury	1.42	0.0070	0.20	ug/l	1.60	ND	89	75-125	1	20	
Batch 2020487 - EPA 3010A											
Blank (2020487-BLK1)					Prepared:	03/04/02	Analyzed	: 03/05/02			
Antimony	ND	16	60	ug/l	Tropurou.	05/04/02	7 mary 200	. 03/03/02			
Arsenic	ND	22	100	'n							
Beryllium	0.172	0.11	1.0	**							
Cadmium	ND	3.6	10	n							
Chromium	ND	2.2	10	н							
Copper	ND	2.2	10	n							
Lead	ND	13	75	11							
Nickel	ND	0.11	30	"							
Selenium	ND	39	100								
Silver	· ND	1.5	7.0	11							
Thallium	ND	21	100	41							
Zinc	ND	- 12	20	11							

Environet, Inc. 2850 Paa Street, Suite 212 Project: Saipan AES
Project Number: [none]

P202349 Reported: 07/12/02 13:25

Honolulu III, 96819

Project Manager: Matt Neal

# Total Metals by EPA 6000/7000 Series Methods - Quality Control Sequoia Analytical - Petaluma

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2020487 - EPA 3010A											110100
Laboratory Control Sample (202048	7-BS1)				Prenared:	03/04/02	Analyzed	1: 03/05/02		<u> </u>	
Antimony	515	16	60	ug/l	500		103	80-120	-		
Arsenic	501	* 22	100	N	500		100	80-120			
Beryllium	52.9	0.11	1.0	•	50.0		106	80-120			
Cadmium	50.8	3.6	10	**	50.0		102	80-120			
Chromium	533	2.2	10	•	500		107	80-120			
Copper	519	2.2	10	"	500		104	80-120			
Lead	521	13	75	"	500		104	80-120			
Nickel	522	11	30	"	500		104	80-120			
Selenium	501	39	100	n	500		100	80-120			
Silver	45.7	1.5	7.0	11	50.0		91	80-120			
Thallium	525	21	100	19	500		105	80-120			
Zinc	512	12	20	"	500		102	80-120			
Matrix Spike (2020487-MS1)		Source:	P202319-	01	Prepared:	03/04/02	Analyzed	l: 03/05/02			
Antimony	293	16	60	ug/l	500	22	54	75-125			OM-0
Arsenic	566	22	100	**	500	42	105	75-125			<b>_</b>
Beryllium	55.2	0.11	1.0	**	50.0	2.9	105	75-125			
Cadmium	54.3	3.6	10	**	50.0	ND	109	75-125			
Chromium	652	2.2	10	н	500	130	104	75-125			
Copper	661	2.2	10	н	500	150	102	75-125			
Lead	538	13	75	19	500	44	99	75-125			
Nickel	705	11	30	**	500	170	107	75-125			
Selenium	468	39	100	•	500	ND	94	75-125			
Silver	45.7	1.5	7.0	41	50.0	ND	91	75-125			
Thallium	545	21	100	11	500	24	104	75-125			
Zinc	776	12	20	**	500	270	101	75-125			
Matrix Spike Dup (2020487-MSD1)		Source:	P202319-	01	Prepared:	03/04/02	Analyzed	l: 03/05/02			
Antimony	297	16	60	ug/l	500	22	55	75-125	1	20	QM-07
Arsenic	572	22	100	11	500	42	106	75-125	1	20	<b>4 5</b>
Beryllium	55.7	0.11	1.0	11	50.0	2.9	106	75-125	0.9	20	
Cadmium	55.5	3.6	10	11	50.0	ND	111	75-125	2	20	
Chromium	657	2.2	10	#	500	130	105	75-125	0.8	20	
Copper	664	2.2	10	**	500	150	103	75-125	0.5	20	
Lead	567	13	75	n	500	44	105	75-125	5	20	
Nickel	708	11	30	n	500	170	108	75-125	0.4	20	
IVICACI											

Sequoia Analytical - Petaluma

The results in this report apply to the samples analyzed in accordance with the chain of custody document. Unless otherwise stated, results are reported on a wet weight basis. This analytical report must be reproduced in its entirety.

Project: Saipan AES Project Number: [none] Project Manager: Matt Neal

P202349 Reported: 07/12/02 13:25

# Total Metals by EPA 6000/7000 Series Methods - Quality Control Sequoia Analytical - Petaluma

Analyte	Result	MDL	Limit	Units	Level	Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2020487 - EPA 3010A										-	
Matrix Spike Dup (2020487-MSD1)		Source:	P202319-	01	Prepared:	03/04/02	Analyzed	l: 03/05/02			
Silver	45.7	1.5	7.0	ug/l	50.0	ND	91	75-125	0	20	
Thallium	525	21	100	n	500	24	100	75-125	4	20	
Zinc	780	12	20	11	500	270	102	75-125	0.5	20	

Environet, Inc. Project: Saipan AES P202349
2850 Paa Street, Suite 212 Project Number: [none] Reported:
Honolulu HI, 96819 Project Manager: Matt Neal 07/12/02 13:25

### **Notes and Definitions**

J Estimated value.

QM-07 The spike recovery was outside control limits for the MS and/or MSD. The batch was accepted based on acceptable LCS

recovery.

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference



# Oceanic Analytical Laboratory, Inc.

LABORATORY USE ONLY

			N society N	R CUSTODY SEALS INTACT	PERATURE & 6 °C			Condition Noted		Please Check Box  Dispose by Lab  Return to Client  Archive
LOCATION	CONTAINERS	NA PAR		OOLER CUST	SCOOLER TEMPERATURE			Date / Time Received		
	est Form	Indicate Analysis Requested	STATE OF THE PARTY	12023446	<b>M</b>			Company / Agency Affiliation Sずごみ		
ii: Info@occanic-labs.com	Custody / Analysis Request Form	Project Identification  Source ATES	Sindge Sindge Oile Oile Oile Oile Oile Oile Oile Oil	HP052-17-22-04H	2030			Received by (Print/Signature)		
Намаіі 96701-3900 108)486-2456 Е-тг	Chain of C	1 1 1	Matterwater  Wastewater  Wastewater  Wastewater  Wastewater					Delivery Method		
99-193 Aiea Heights Drive, Suite 121 Aiea, Hawaii 96701-3900 Telephone: (808)486-LABS (5227) Fax: (808)486-2456 E-mail: Info@oceanic-labs.com		五~c #212	<u>                                    </u>	١,٠,٠	7-0.0			Date / Time Released		
99-193 Aiea Heigh Telephone: (808)4,		Report To Meth Neal Company Name  Company Name  Address  Address  Company Name  Compan	Simple 16 16 16 16 16 16 16 16 16 16 16 16 16	7010095 W	3 TO (009 5W 14	9 2 4	9 6 10 10 10 10 10 10 10 10 10 10 10 10 10	Releas (PrinVSic	That was the	Comments:

Yellow - Oceanic Analytical

White - Oceanic Analytical

July 12, 2002

Matt Neal Environet, Inc. 2850 Paa Street, Suite 212 Honolulu, HI 96819 RE: Saipan AES / P205412

Enclosed are the results of analyses for samples received by the laboratory on 05/20/02. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Angelee Cari Project Manager

CA ELAP Certificate Number 2374

Environet, Inc.
Project: Saipan AES

2850 Paa Street, Suite 212
Project Number: [none]
Reported:
Honolulu HI, 96819
Project Manager: Matt Neal

07/12/02 13:05

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
F01009SW06-0.0	P205412-01	Water	05/09/02 06:10	05/20/02 10:55
F01009SW11-0.0	P205412-02	Water	05/09/02 06:17	05/20/02 10:55
F01009SW13-0.0	P205412-03	Water	05/09/02 06:21	05/20/02 10:55

Project Number: [none]
Project Manager: Matt Neal

P205412 Reported: 07/12/02 13:05

# Total Metals by EPA 6000/7000 Series Methods Sequoia Analytical - Petaluma

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009SW06-0.0 (P205412-01) Water	Sampl	ed: 05/09/02	06:10 Re	ceived: 0	5/20/02 10:	:55	DGE 4	4.	En a A	o.
Mercury	ND	0.0070	0.20	ug/l	1	2050565	05/30/02	05/30/02	EPA 7470A	
Antimony	ND	16	60	n la	"	2050606	05/29/02	06/03/02	EPA 6010B	
Arsenic	ND	22	100	"	11	11	"	11	EI A OUTOB	
Beryllium	0.13	0.11	1.0	n	"	11	N N		n	, and 100 to
Cadmium	ND	3.6	10	u	**	и :1	"	11	и	4
Chromium	14	2.2	10	n = "	н	п	"	11	"	
Copper	18	2.2	10	11	**		n		"	
Lead	15	13	75	**	11	0	**	11	" "	
Nickel	11	11	30	11	н		11	"		J. J
Selenium	ND	39	100	n T	11	н .	"	" "	"	J
Silver	ND	1.5	7.0		11	11	" "	n	п	
Thallium	ND	21	100	n		n	"	"	"	
Zinc	66	12	20	**	**		- 11	" "	11	
F01009SW11-0.0 (P205412-02) Water	Sample	ed: 05/09/02 (	6:17 Rec	eived: 05	/20/02 10:	55				
Mercury	ND	0.0070	0.20	ug/l	1	2050565	05/30/02	05/30/02		
Antimony	ND	16	60	11	1	2050606	05/29/02		EPA 7470A	
Arsenic	ND	22	100	**	"	2030000	03/29/02	06/03/02	EPA 6010B	
Beryllium	ND	0.11	1.0	,,	п	ti		"	"	
Cadmium	ND	3.6	10	11	н		11	 H		
Chromium	6.9	2.2	10	er	11		н		"	
Copper	24	2.2	10	н	H	н		11	II .	J
							11	"	Ħ	
Lead	23	13	75	11	**					
Je <b>ad</b> Nickel	23 ND	13 11	75 30	"	"	"			11	J
	ND	11	30			11	11	"	n	J
lickel	ND ND	11 39	30 100	•	n n	11	11	11	n	J
lickel elenium	ND	11	30	11	n	11	11	"	n	J

Project: Saipan AES
Project Number: [none]
Project Manager: Matt Neal

P205412 Reported: 07/12/02 13:05

# Total Metals by EPA 6000/7000 Series Methods Sequoia Analytical - Petaluma

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009SW13-0.0 (P205412-03) Water	Sample	ed: 05/09/02	06:21 Red	eived: 0	5/20/02 10:	:55	ja e	THE THE		in .
Mercury	ND	0.0070	0.20	ug/l	1	2050565	05/30/02	05/30/02	EPA 7470A	501
Antimony	ND	16	60	11	"	2050606	05/29/02	06/03/02	EPA 6010B	
Arsenic	ND	22	100		**	**	"	n	n	
Beryllium	ND	0.11	1.0		n	**		u	"	
Cadmium	ND	3.6	10	**	11	**	н	**	"	
Chromium	ND	2.2	10	н	n		н	11	"	
Copper	4.4	2.2	10	п	**	н	n	n	н	- 1
Lead	ND	13	75	11	"	11	ii ii	**	п	100
Nickel	ND	11	30	n	"	11	ij	**	11	
Selenium	ND	39	100	11		n	11	er	11	
Silver	ND	1.5	7.0	**	**	н	11	н	11	
Thallium	ND	21	100		**	**		n		
Zinc	42	12	20	n	*1	"	11	11	n	

Project Number: [none]
Project Manager: Matt Neal

P205412 Reported: 07/12/02 13:05

# Total Metals by EPA 6000/7000 Series Methods - Quality Control Sequoia Analytical - Petaluma

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2050565 - EPA 7470A					<u>.</u>						
Blank (2050565-BLK1)					Prepared of	& Analyze	ed: 05/30/	02	Sh.	- 4	
Mercury	ND	0.0070	0.20	ug/l	-						·
Laboratory Control Sample (205056	5-BS1)				Prepared a	& Analyze	d: 05/30/	02			
Mercury	1.52	0.0070	0.20	ug/l	1.60		95	80-120			
Matrix Spike (2050565-MS1)		Source:	P205412-	01	Prepared 6	& Analvze	d: 05/30/	02			
Mercury	1.56	0.0070	0.20	ug/l	1.60	ND	97	75-125			·
Matrix Spike Dup (2050565-MSD1)		Source:	P205412-	01	Prepared of	& Analyze	ed: 05/30/0	02			
Mercury	1.58	0.0070	0.20	ug/l	1.60	ND	99	75-125	1	20	
Batch 2050606 - EPA 3010A											
Blank (2050606-BLK1)					Prepared:	05/29/02	Analyzed	: 06/03/02			
Antimony	ND	16	60	ug/l							
Arsenic	ND	22	100	1111							
<b>T</b>			100								
Beryllium	ND	0.11	1.0	11							
Beryllium Cadmium	ND ND										
•		0.11	1.0	11							
Cadmium	ND	0.11 3.6	1.0 10	11							
Cadmium Chromium	ND ND	0.11 3.6 2.2	1.0 10 10	11 11						•	
Cadmium Chromium Copper	ND ND ND	0.11 3.6 2.2 2.2	1.0 10 10 10	11 11 11						•	
Cadmium Chromium Copper Lead	ND ND ND 23.4	0.11 3.6 2.2 2.2 13	1.0 10 10 10 75	11 19 11 11							
Cadmium Chromium Copper Lead Nickel	ND ND ND 23.4 ND	0.11 3.6 2.2 2.2 13	1.0 10 10 10 75 30	11 11 11 11						•	
Cadmium Chromium Copper Lead Nickel Selenium	ND ND ND 23.4 ND	0.11 3.6 2.2 2.2 13 11 39	1.0 10 10 10 75 30	11 11 11 11						•	

Project: Saipan AES
Project Number: [none]
Project Manager: Matt Neal

P205412 Reported: 07/12/02 13:05

# Total Metals by EPA 6000/7000 Series Methods - Quality Control Sequoia Analytical - Petaluma

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC	RPD	RPD Limit	Notes
Batch 2050606 - EPA 3010A										· · · · · · · · · · · · · · · · · · ·	, 2
Laboratory Control Sample (2050606	5-BS1)				Prepared:	05/29/02	Analyzed	1: 06/03/02			
Antimony	489	16	60	ug/l	500		98	80-120			
Arsenic	473	22	100	"	500		95	80-120			
Beryllium	47.3	0.11	1.0		50.0		95	80-120			
Cadmium	48.4	3.6	10	Ħ	50.0		97	80-120			
Chromium	482	2.2	10	R	500		96	80-120			
Copper	473	2.2	10	11	500		95	80-120			
ead	482	13	75	"	500		96	80-120			
Nickel	489	11	30	Ħ	500		98	80-120			
Selenium	493	39	100	n	500		99	80-120			
Silver	47.2	1.5	7.0	**	50.0		94	80-120			
Thallium	496	21	100	11	500		99	80-120			
Cinc	466	12	20	"	500		93	80-120			
atrix Spike (2050606-MS1) Source: P205414-14					Prepared:	05/29/02					
antimony	483	16	60	ug/l	500	ND	97	75-125			
Arsenic	479	22	100	11	500	ND	96	75-125			
Beryllium	47.1	0.11	1.0	"	50.0	ND	94	75-125			
Cadmium	47.0	3.6	10	"	50.0	ND	94	75-125			
Chromium	480	2.2	10	"	500	ND	96	75-125			
Copper	473	2.2	10	**	500	ND	95	75-125			
ead	482	13	75	11	500	ND	96	75-125			
lickel	490	11	30	"	500	ND	98	75-125			
elenium	451	39	100	п	500	ND	90	75-125			
Silver	47.2	1.5	7.0	11	50.0	ND	94	75-125 75-125			
Thallium	487	21	100	"	500	ND	97	75-125 75-125			
line	471	12	20	n	500	ND	94	75-125			
Matrix Spike Dup (2050606-MSD1)		Source:	P205414-1	4	Prepared:	05/29/02	Analyzed:	: 06/03/02			
Antimony	488	16	60	ug/l	500	ND	98	75-125	1	20	
Arsenic	489	22	100	"	500	ND	98	75-125	2	20	
Beryllium	47.4	0.11	1.0	n	50.0	ND	95	75-125	0.6	20	
admium	48.3	3.6	10	11	50.0	ND	97	75-125	3	20	
Chromium	486	2.2	10	11	500	ND	97	75-125	1	20	
Copper	472	2.2	10	11	500	ND	94	75-125	0.2	20	
ead	485	13	75	*1	500	ND	97	75-125 75-125	0.2		
lickel	492	11	30	п	500	ND	98	75-125 75-125		20	
					500	1472	70	13-123	0.4	20	

Sequoia Analytical - Petaluma

The results in this report apply to the samples analyzed in accordance with the chain of custody document. Unless otherwise stated, results are reported on a wet weight basis. This analytical report must be reproduced in its entirety.

Project: Saipan AES
Project Number: [none]

P205412 Reported: 07/12/02 13:05

Project Manager: Matt Neal

Ortal Metals by EPA 6000/7000 Series M

# Total Metals by EPA 6000/7000 Series Methods - Quality Control Sequoia Analytical - Petaluma

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2050606 - EPA 3010A			-							U.	
Matrix Spike Dup (2050606-MSD1)		Source: P205414-14		Prepared:	05/29/02	Analyzed	l: 06/03/02				
Silver	47.3	1.5	7.0	ug/l	50.0	ND	95	75-125	0.2	20	
Thallium	500	21	100	n	500	ND	100	75-125	3	20	
Zinc	474	12	20	Ħ	500	ND	95	75-125	0.6	20	

Environet, Inc.
Project: Saipan AES

2850 Paa Street, Suite 212
Project Number: [none]

Honolulu HI, 96819
Project Manager: Matt Neal

Project Manager: Matt Neal

### **Notes and Definitions**

J Estimated value.

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference

			- 0									
Environet					A	naly	ses F	Requi	red			
2850 Paa Street, Suite 212, Honolulu Ph: (808) 833-225 Fax: (808) 83	<b>A</b>	1				T	T	T	$\top$	7		
Project Name/Number	3-2231		12/2	₫	1							
Saipan AER Fol Sampler(s) Signature, Matter Mal	009		100									
Sampler(s) Signature	<del></del>		12/2									
1 altog lest			ğ	1			1			1		
Sample Identification Number	Date	Time	1									No. of Container
F010095W06-0.0	5-9-0)	0610	X		PC	0	541	2-	31			1
F010095W11-0.0	1	06 17	·X					-	02			1,
FO1009SW 13-0.0	14	0621	X				V	-	03		T	1
											7	
	<u> </u>	<u></u>										
		1										
	10 1/											
		1										
	1100											
<i></i>						TOPPO	D71.0				-	
			٦	JULI	RC	BIU	DIS		INT	l	L	1
				*				NO	INI	ACT		
			C	)OL.	RI	MPI	RAT	URE	1.			C
												<del> </del>
		-									_	
		·						Total	No. o	f Cont	ainers	3
Special Instructions:												
Relinquished by: NUTTU G Pool	Date		Receiv	ed by		1.	\			<sub>[</sub> Da		Time
	5-17-02	1300	DUN	UK		1	T				02	360
Relinquished by:	Date		Receiv	ed by:	21	M	1			<sup>'</sup> Da		Time
	5/20/02	1105		<u>M</u>	4	U (6				5/20	2/02	1055
Relinquished by:	Date	Time	Receiv	ed by	Labora	atory:				Da	ite	Time
	<u> </u>											i I

September 11, 2002

Matt Neal Environet, Inc. 2850 Paa Street, Suite 212 Honolulu, HI 96819 RE: Saipan AES / P208284

Enclosed are the results of analyses for samples received by the laboratory on 08/16/02. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Angelee Cari Project Manager

CA ELAP Certificate Number 2374

Project: Saipan AES
Project Number: [none]
Project Manager: Matt Neal

P208284 Reported: 09/11/02 17:37

#### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
F01009SW06	P208284-01	Water	08/12/02 08:12	08/16/02 10:40
F01009SW11	P208284-02	Water	08/12/02 08:16	08/16/02 10:40
F01009SW14	P208284-03	Water	08/12/02 08:21	08/16/02 10:40
F01009SW Dai Ich	P208284-04	Water	08/12/02 12:00	08/16/02 10:40
Drain 4	P208284-05	Water	08/12/02 08:18	08/16/02 10:40
Drain 6	P208284-06	Water	08/12/02 08:35	08/16/02 10:40
Drain 11	P208284-07	Water	08/12/02 08:46	08/16/02 10:40
Drain 4	P208284-08	Water	07/29/02 20:12	08/16/02 10:40
Drain 6	P208284-09	Water	07/29/02 20:23	08/16/02 10:40
Drain 11	P208284-10	Water	07/29/02 20:39	08/16/02 10:40
HAFA ADAI HOTEL	P208284-11	Water	07/29/02 20:50	08/16/02 10:40

Project: Saipan AES
Project Number: [none]
Project Manager: Matt Neal

P208284 Reported: 09/11/02 17:37

Analyte	Result	MDL R	eporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009SW06 (P208284-01) Water	Sampled:	08/12/02 08:12	Receiv	ed: 08/16	/02 10:40		134,1 I		s 4 5 <sup>(1)</sup>	
Barium	23	0.50	10	ug/l	1	2080592	08/30/02	09/05/02	EPA 6020	- 111
Mercury	0.039	0.0070	0.20	"	n	2080449	08/30/02	08/30/02	EPA 7470A	J
Antimony	1.5	0.55	5.0	**	**	2080592	08/30/02	09/05/02	EPA 6020	J
Arsenic	3.8	1.3	5.0	н	n	11	, n	n	п	J
Beryllium	ND	0.89	4.0	"	**	"	n n	11	н	
Cadmium	0.83	0.13	0.50		11	11	·	11	H	
Chromium	13	0.65	10	"	И	"	**	"		
Copper	23	0.48	10	#1	11	А. и	. "	"	**	
Lead	8.6	0.21	3.0	н	**	n	H H	rt .	n	
Nickel	8.2	0.48	10	н	•	Ħ	tt	11	n	J
Selenium	2.2	1.4	5.0	11	**	11	n	11	n	О
Silver	0.17	0.12	1.0	"	**	U	11	"	11	
Thallium	ND	0.23	2.0	n	II	n	"	n	"	0.08
Zinc	130	2.8	30	n	"	н	n	н	**	
F01009SW11 (P208284-02) Water	Sampled:	08/12/02 08:16	Receiv	ed: 08/16	/02 10:40					
Barium	42	0.50	10	ug/l	1	2080592	08/30/02	09/05/02	EPA 6020	
Mercury	0.026	0.0070	0.20	"	н	2080449	08/30/02	08/30/02	EPA 7470A	J
Antimony	<b>5.8</b>	0.55	5.0	"	н	2080592	08/30/02	09/05/02	EPA 6020	_
Arsenic	12	1.3	5.0	"		н	tt	n	n	
Beryllium	ND	0.89	4.0	н	**	n	Ħ	11	п	
Cadmium	1.6	0.13	0.50	п	"	11	11		11	
Chromium	41	0.65	10	11	n	**	11			
Copper	94	0.48	10	"	n	**		**	н	
					**	**	**	и	n	
Lead	44	0.21	3.0	"						
= =	44 120	0.21 0.48	3.0 10	n (1	"	н	u	"	11	
Lead						n H	n n	n n	11	ř
Lead Nickel	120	0.48	10	н	"					ı
Lead Nickel Selenium	120 4.4	0.48 1.4	10 5.0	H 10	11	14	n	"	11	1

Project: Saipan AES
Project Number: [none]
Project Manager: Matt Neal

P208284 Reported: 09/11/02 17:37

Analyte	Result	MDL R	eporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009SW14 (P208284-03) Water	Sampled:	08/12/02 08:21	Receiv	ed: 08/16	/02 10:40	âu s			1 3	1 1
Barium	8.0	0.50	10	ug/l	1	2080592	08/30/02	09/05/02	EPA 6020	n a Ē
Mercury	ND	0.0070	0.20	и 🤝	11	2080449	08/30/02	08/30/02	EPA 7470A	
Antimony	1.2	0.55	5.0	н	n	2080592	08/30/02	09/05/02	EPA 6020	
Arsenic	ND	1.3	5.0	н	н	"	n n	"	"	
Beryllium	ND	0.89	4.0	11	11	и	н	н	н	
Cadmium	0.48	0.13	0.50	n	n =	n	11	tt	ti .	
Chromium	15	0.65	10	11	tt .	н	н	ti	n	
Copper	6.2	0.48	10	11	n n	н	ti ti	ti	n	II y
Lead	1.1	0.21	3.0	11		TT TT	н	н	11	
Nickel	7.6	0.48	10	11	**	п п	11	11	•	ы п
Selenium	ND	1.4	5.0	11	H	11	11	11	"	
Silver	ND	0.12	1.0	**	н	11 11	11	"	п	
Thallium	ND	0.23	2.0	"	H	**			н	
Zinc	140	2.8	30	• 11	tt	"	*** <b>u</b>	"	н	
F01009SW Dai Ich (P208284-04) W	ater Sam	pled: 08/12/02 1	2:00 R	eceived:	08/16/02 1	0:40		201		
Barium	8.4	0.50	10	ug/l	1	2080592	08/30/02	09/05/02	EPA 6020	- 10
Mercury	0.015	0.0070	0.20	**	11	2080449	08/30/02	08/30/02	EPA 7470A	1
Antimony	1.8	0.55	5.0	**	"	2080592	08/30/02	09/05/02	EPA 6020	
Arsenic	11	1.3	5.0	n	"	Ħ	"	11	"	
Beryllium -	ND	0.89	4.0	n ::(5)	**	11		19	**	
Cadmium	0.48	0.13	0.50	**	tt	11	"		*1	
Chromium	17	0.65	10	*1	н	"	. "	**	n	
Copper	8.9	0.48	10	"	n	**	н	n n	n	wegil i
Lead	ND	0.21	3.0	**	n	**	**	"	11	
Nickel	11	0.48	10	"	11	e e	n	11	"	
(AICVC)			5.0	H	11	l n	н	п	**	
Selenium	14	1.4	5.0							
	14 ND	0.12	1.0		н	**	n	"	11	
Selenium				# <sub>/</sub> /	11	11	"	" -	11 R	

Project: Saipan AES
Project Number: [none]
Project Manager: Matt Neal

P208284 Reported: 09/11/02 17:37

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Drain 4 (P208284-05) Water	Sampled: 08/12/	02 08:18	Received: 08	/16/02 10	):40		** =	n. 1 (2)	-1615	
Barium	60	0.50	10	ug/l	1	2080592	08/30/02	09/05/02	EPA 6020	u III-
Mercury	0.017	0.0070	0.20	H )(	**	2080449	08/30/02	08/30/02	EPA 7470A	= <b>y</b>
Antimony	2.3	0.55	5.0	"	"	2080592	08/30/02	09/05/02	EPA 6020	J
Arsenic	12	1.3	5.0	n	"	11	n n	и	н	
Beryllium	ND	0.89	4.0	n	**			**	11	
Cadmium	1.1	0.13	0.50	**	11	u u	**		"	
Chromium	41	0.65	10	**	n	u	п	"	n 25	
Copper	49	0.48	10	**	Ħ	**	ч	**	**	
Lead	9.3	0.21	3.0	"	н	"	п	n	н	
Nickel	40	0.48	10		44	n	n	н	n	
Selenium	4.3	1.4	5.0			11		"	н	ı, y
Silver	ND	0.12	1.0	ti	"	n	11	"	11	
Thallium	ND	0.23	2.0	n	11	ч		п	11	
Zinc	160	2.8	30	n	11	"	"	н	"	
Drain 6 (P208284-06) Water	Sampled: 08/12/	02 08:35	Received: 08	/16/02 10	:40					
Barium	12	0.50	10	ug/l	1	2080592	08/30/02	09/05/02	EPA 6020	1.5
Mercury	0.010	0.0070	0.20		"	2080449	08/30/02	08/30/02	EPA 7470A	J
Antimony	1.4	0.55	5.0	" =	"	2080592	08/30/02	09/05/02	EPA 6020	J
Arsenic	2.9	1.3	5.0	Ħ	**	11	**	n	"	J
Beryllium	ND	0.89	4.0	*1	"	**		н	"	
Cadmium	0.83	0.13	0.50	11	**		÷, •	п		qui ma
Chromium	20	0.65	10	11	Ħ	n	n n	н	n g	
Copper	16	0.48	10	**	ti	н	tt	И	n	
Lead	3.2	0.21	3.0	**	11	11	n	11	n	
Nickel	5.3	0.48	10	**		- 11	n	"	н	J
	3.775	1.4	5.0	"	"	н	ti	**	н	
Selenium	ND	1								
Selenium Silver	ND ND	0.12	1.0	**	"	11	н	**	11	
			1.0 2.0	"	11 11	n n	, "	11	11	NV.

Project Number: [none]
Project Manager: Matt Neal

P208284 Reported: 09/11/02 17:37

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Drain 11 (P208284-07) Water	Sampled: 08/12	/02 08:46	Received: 0	8/16/02 1	0:40		TF 1			_
Barium	34	0.50	10	ug/l	1	2080592	08/30/02	09/05/02	EPA 6020	- 10
Mercury	0.041	0.0070	0.20	и , :	. 11	2080449	08/30/02	08/30/02	EPA 7470A	- J
Antimony	6.0	0.55	5.0	# ·	Ħ	2080592	08/30/02	09/05/02	EPA 6020	
Arsenic	11	1.3	5.0	11	11	"	ti	**	n n	
Beryllium	ND	0.89	4.0	ti	11	"	**	n	**	
Cadmium	1.8	0.13	0.50	11		ti ti	"	n	"	
Chromium	47	0.65	10	11	11	н	"	#1	u III	
Copper	87	0.48	10	0	**	, 0		ti	"	
Lead	58	0.21	3.0	1)	**	"	"	11	"	
Nickel	35	0.48	10	"		"	"	11	,,	
Selenium	1.9	1.4	5.0		"	n	n	"	rr	10 T
Silver	ND	0.12	1.0	"	**	п	n	**	n	:
Thallium	ND	0.23	2.0	11	u	**		H	11	
Zinc	330	2.8	30	· ·	11	11	ıı	tl	11	
Drain 4 (P208284-08) Water	Sampled: 07/29/	02 20:12	Received: 08	/16/02 10	:40					
Barium	34	0.50	10	ug/l	1	2080592	08/30/02	09/05/02	EPA 6020	n rainté
Mercury	0.062	0.0070	0.20	11	11	2080449	08/30/02	08/30/02	EPA 7470A	J, HT-04
Antimony	3.3	0.55	5.0	11	tı	2080592	08/30/02	09/05/02	EPA 6020	e in g
Arsenic	9.6	1.3	5.0	п.	"	. н	. 0		n	
Beryllium	ND	0.89	4.0	11 - 1	"	11	11	"	n	
Cadmium	2.5	0.13	0.50	н . =	**	n	, 11	11	ti	
Chromium	44	0.65	10	•	#	i n	**	н	11	
Copper	43	0.48	10		"	11	**	н	**	
Lead	18	0.21	3.0	n 2	n !	**		11	"	
Nickel	29	0.48	10	**	n	L e	"	"	**	
Selenium	2.6	1.4	5.0	н .	*1	**	ш	11	**	- i J
Scientin							er er			
Silver	0.21	0.12	1.0	"	**	. 41		"	**	J
	<b>0.21</b> ND	0.12 0.23	1.0 2.0	11	11	. H	1 H	"	"	- J

Project: Saipan AES
Project Number: [none]
Project Manager: Matt Neal

P208284
Reported:
09/11/02 17:37

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Drain 6 (P208284-09) Water	Sampled: 07/29/	02 20:23	Received: 08	/16/02 10	:40	i am		26 -	131	
Barium	11	0.50	10	ug/l	1	2080592	08/30/02	09/10/02	EPA 6020	
Mercury	0.013	0.0070	0.20	"	n	2080449	08/30/02	08/30/02	EPA 7470A	J, HT-04
Antimony	1.1	0.55	5.0	**	11	2080592	08/30/02	09/10/02	EPA 6020	J
Arsenic	3.9	1.3	5.0	Ħ	11	11	11	"	n	J
Beryllium	ND	0.89	4.0	tt	11	**	**	11	11	
Cadmium	0.39	0.13	0.50	fI	tt	"	R.	11	н	J
Chromium	10	0.65	10	N	n		н	11	11	
Copper	11	0.48	10	11	n n	n n	ŧI	**	"	
Lead	2.4	0.21	3.0	**	н 1	11	tt	#	п	J
Nickel	4.9	0.48	10	**	u	**	Ħ	n	11	, j
Selenium	ND	1.4	5.0	**	**	"	- 8	n	n	-
Silver	0.20	0.12	1.0	n		n	"	Ħ		J
Thallium	0.23	0.23	2.0	н	11	11	н	11	**	J
Zinc	75	2.8	20	"	н	н	ti	11	TT .	•
Drain 11 (P208284-10) Water	Sampled: 07/29	/02 20:39	Received: 0	8/16/02 1	0:40					
Barium	11	0.50	10	ug/l	1	2080592	08/30/02	09/05/02	EPA 6020	
Mercury										
	ND	0.0070	0.20	"		2080449	08/30/02	08/30/02	EPA 7470A	HT-04
Antimony	ND 1.2	0.0070 0.55	0.20 5.0			2080449 2080592	08/30/02 08/30/02	08/30/02 09/05/02	EPA 7470A EPA 6020	HT-04
Antimony Arsenic				H	•			08/30/02 09/05/02	EPA 7470A EPA 6020	J
•	1.2	0.55	5.0	11	11	2080592	08/30/02	09/05/02	EPA 6020	
Arsenic	1.2 2.0	0.55 1.3	5.0 5.0	n n	11 11	2080592	08/30/02	09/05/02	EPA 6020	J
<b>Arsenic</b> Beryllium	1.2 2.0 ND	0.55 1.3 0.89	5.0 5.0 4.0	11 11	11 11 11	2080592	08/30/02	09/05/02	EPA 6020	J
Arsenic Beryllium Cadmium	1.2 2.0 ND 0.53	0.55 1.3 0.89 0.13	5.0 5.0 4.0 0.50	H H H H	# # # #	2080592	08/30/02	09/05/02 " "	EPA 6020	J
Arsenic Beryllium Cadmium Chromium	1.2 2.0 ND 0.53 21	0.55 1.3 0.89 0.13 0.65	5.0 5.0 4.0 0.50 10	" " " "	11 11 11 11	2080592	08/30/02	09/05/02	EPA 6020	1
Arsenic Beryllium Cadmium Chromium Copper	1.2 2.0 ND 0.53 21 12	0.55 1.3 0.89 0.13 0.65 0.48	5.0 5.0 4.0 0.50 10	n n n n n	11 11 11 11 11	2080592	08/30/02	09/05/02	EPA 6020 " " "	1 1 1
Arsenic Beryllium Cadmium Chromium Copper Lead	1.2 2.0 ND 0.53 21 12	0.55 1.3 0.89 0.13 0.65 0.48 0.21	5.0 5.0 4.0 0.50 10 10 3.0	n n n n n n	11 11 11 11 11 11 11	2080592	08/30/02	09/05/02	EPA 6020 " " " "	1 1 1
Arsenic Beryllium Cadmium Chromium Copper Lead	1.2 2.0 ND 0.53 21 12 1.7 7.6	0.55 1.3 0.89 0.13 0.65 0.48 0.21 0.48 1.4	5.0 5.0 4.0 0.50 10 10 3.0	n n n n n n	0 11 11 11 11 12 12	2080592	08/30/02	09/05/02	EPA 6020	1 1 1
Arsenic Beryllium Cadmium Chromium Copper Lead Nickel Selenium	1.2 2.0 ND 0.53 21 12 1.7 7.6	0.55 1.3 0.89 0.13 0.65 0.48 0.21 0.48	5.0 5.0 4.0 0.50 10 10 3.0 10 5.0	n n n n n n	" " " " " " " "	2080592	08/30/02	09/05/02	EPA 6020	1 1 1 1

Project: Saipan AES
Project Number: [none]
Project Manager: Matt Neal

P208284 Reported: 09/11/02 17:37

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
HAFA ADAI HOTEL (P208284-11)	Water S	Sampled: 07/	29/02 20:50	Receive	ed: 08/16/0	2 10:40				
Barium	12	0.50	10	ug/l	1	2080592	08/30/02	09/05/02	EPA 6020	· · · · ·
Mercury	0.013	0.0070	0.20	n .	"	2080449	08/30/02	08/30/02	EPA 7470A	J, HT-04
Antimony	1.3	0.55	5.0	11	11	2080592	08/30/02	09/05/02	EPA 6020	· J
Arsenic	2.6	1.3	5.0	11	*1	**	"	**	"	J
Beryllium	ND	0.89	4.0	*1	**	**	<i></i>	**	11	-
Cadmium	0.54	0.13	0.50	"	"	н	n	11	tr.	
Chromium	19	0.65	10	•	**			**	u	
Copper	13	0.48	10	"	**	Ħ	11	11	n	
Lead	5.9	0.21	3.0	**	"	Ħ	н	**	Ħ	
Nickel	7.0	0.48	10	11	"	**	"	11	**	10° T
Selenium	ND	1.4	5.0	ft I	n	"	"	n		
Silver	ND	0.12	1.0	n	n	**	"	ti		
<b>Fhallium</b>	ND	0.23	2.0	11	**	ŧŧ	Ħ	**		
Zinc	94	2.8	30			**	н		**	

Project: Saipan AES
Project Number: [none]
Project Manager: Matt Neal

P208284 Reported: 09/11/02 17:37

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2080449 - EPA 7470A		<u> </u>		<u> </u>							=
Blank (2080449-BLK1)		4			Prepared a	& Analyze	d: 08/30/0	02			
Mercury	ND	0.0070	0.20	ug/l							
Laboratory Control Sample (2080449	-BS1)				Prepared a	& Analyze	d: 08/30/0	02			
Mercury	1.64	0.0070	0.20	ug/l	1.60		102	80-120			
Matrix Spike (2080449-MS1)		Source	: P208284-	02	Prepared &	& Analyze	:d: 08/30/0	02			
Mercury	1.66	0.0070	0.20	ug/l	1.60	0.026	102	80-120			
Matrix Spike Dup (2080449-MSD1)		Source	: P208284-	02	Prepared &	& Analyze	:d: 08/30/0	02			
Mercury	1.66	0.0070	0.20	ug/l	1.60	0.026	102	80-120	0	20	
Batch 2080592 - EPA 3010A											
Blank (2080592-BLK1)					Prepared:	08/30/02	Analyzed	: 09/05/02			
Antimony	1.38	0.55	5.0	ug/l							
Barium	ND	0.50	10	11							
Arsenic	ND	1.3	5.0	"							
Beryllium	ND	0.89	4.0	н							
Cadmium	ND	0.13	0.50	"							
Chromium	ND	0.65	10	11							
Copper	0.595	0.48	10	tı							
Lead	ND	0.21	3.0	H							
Nickel	ND	0.48	10	11							
Selenium	2.11	1.4	5.0	"							
Silver	ND	0.12	1.0	11							
Thallium	ND	0.23	2.0	Ħ							
Zinc	28.1	2.8	30	11							

2850 Paa Street, Suite 212

Project: Saipan AES

P208284
Reported:

Honolulu HI, 96819

Project Number: [none]
Project Manager: Matt Neal

Neported: 09/11/02 17:37

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2080592 - EPA 3010A		===	121				3				
Laboratory Control Sample (2080:	592-BS1)				Prepared:	08/30/02	Analyzed	1: 09/05/02			
Antimony	543	0.55	5.0	ug/l	500		109	80-120			
Barium	547	0.50	10	ti	500		109	80-120			
Arsenic	530	1.3	5.0	**	500		106	80-120			
Beryllium	53.5	0.89	4.0	**	50.0		107	80-120			
Cadmium	54.6	0.13	0.50	11	50.0		109	80-120			
Chromium	550	0.65	10	Ħ	500		110	80-120			
Copper	525	0.48	10	*1	500		105	80-120			
Lead	533	0.21	3.0	11	500		107	80-120			
Nickel	557	0.48	10	11	500		111	80-120			
Selenium	519	1.4	5.0	**	500		104	80-120			
Silver	52.1	0.12	1.0		50.0		104	80-120			
Thallium	533	0.23	2.0	**	500		107	80-120			
Zinc	549	2.8	30	"	500		110	80-120			
Matrix Spike (2080592-MS1)		Source:	P208284-	01	Prepared:	08/30/02	Analyzed	1: 09/05/02			
Antimony	544	0.55	5.0	ug/l	500	1.5	108	80-120			
Barium	565	0.50	10	"	500	23	108	80-120			
Arsenic	534	1.3	5.0	11	500	3.8	106	80-120			
Beryllium	54.3	0.89	4.0	**	50.0	ND	109	80-120			
Cadmium	53.8	0.13	0.50	**	50.0	0.83	106	80-120			
Chromium	562	0.65	10	**	500	13	110	80-120			
Copper	521	0.48	10	#1	500	23	100	80-120			
Lead	529	0.21	3.0	11	500	8.6	104	80-120			
Nickel	534	0.48	10	tt	500	8.2	105	80-120			
Selenium	510	1.4	5.0	11	500	2.2	102	80-120			
Silver	50.8	0.12	1.0	11	50.0	0.17	101	80-120			
Thallium	526	0.23	2.0	11	500	ND	105	80-120			
Zinc	648	2.8	30		500	130	104	80-120			

Project: Saipan AES
Project Number: [none]
Project Manager: Matt Neal

P208284 Reported: 09/11/02 17:37

#### **Notes and Definitions**

HT-04 This sample was analyzed beyond the EPA recommended holding time. The results may still be useful for their intended purpose.

J Estimated value.

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference

C	hair	ı of	Cu	st	od	У						
Environet	··· •• · · ·		١,	b: /t>	Ą	naly	ses R	egu	ired			8
2850 Paa Street, Suite 212, Honolulu, F Ph: (808) 833-225 Fax: (808) 833-			1				ν.		,	1.00	- 1	1
Design Alexandria			13	*> 3	13			9. 7	-		Arres .	
Sampler(s) Signature	009		100	, 5		. to		d <sub>u</sub>				
Matt Meal		T find	12	7	. DA. 1	1.	2:			<b>\</b> *	15	
Sample Identification Number	Date	Time	40.	ر ا ا	,~·^	F	27		1.2			No. of Containers
FOIOMSWOG	8/12/02	08:12	X	K		Ĺ	Pac	ठि	84	-01		i
F01009SW 11	1	08:16								-07	1	(
F010095W14		08:21	(	1						-0	В	(
F0,0095 w Da: Ich.			X	×						-0	4	
	8/12/02	8:18	×	7		<u> </u>				-0	18	1
3 4490 6	2/17/02	8:35	۲	x						-	06	1
DRAIN 11	8/13/02	846	×	X						7	<b>0</b> 7	١
DRAIN 4	7/29/02	2012	×	X						7	X	)
DRAIN 6	7/29/02	2023	ኦ	X			254			_	09	1
DRAIN 11	7/29/02	2039	×	X						-	0	1
HAFA ADAI YOTEL.	7/29/02	2050	X	X				1		-	11	1
		C <b>O</b> O		1.61		VEA!	SA	TAC	rO			16
		COO		1024	00.		T E	1				
								6	n	0,		
		COC		~ M	PER	TUR	E					
									<u> </u>			
									<u> </u>			
	!								<u> </u>			
			(4)						<u> </u>			
	· · · · · · · · · · · · · · · · · · ·			·····					l No. c			
Special Instructions: All Samples Tooked place que estimate	For	13	1000	太	po	du	ber	3	P1	. کین	bar	-رثسب
please que estrunt	2,5	" flo	GGZ.	Q (	ه)م	ण्य	Cor	(0	sion (	حبدا	d	etection
Relinquished by:  AGS.	Date		Recei	ved by	· · · ·	Ta			- 1	Da		Time
	8/14/0/ Date	76 30 Time	Recei	KC	11	10				<del>/ -</del>	/03	1040
Relinquished by:	Date	1 11116	Vecel,	veu by						Da	ite	Time
Relinquished by:	Date	Time	Receiv	ved by	Labor	atory:	<del>,,</del>			Da	ite	Time



January 27, 2003

Matt Neal Environet, Inc. 2850 Paa Street, Suite 212 Honolulu, HI 96819 RE: Saipan AES / P212376

Enclosed are the results of analyses for samples received by the laboratory on 12/19/02. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Angelee Cari Project Manager

CA ELAP Certificate Number 2374

gelle Casi





Environet, Inc. 2850 Paa Street, Suite 212 Project: Saipan AES

Project Number: F01009

P212376 Reported:

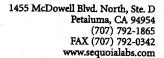
Honolulu HI, 96819

Project Manager: Matt Neal

01/27/03 12:02

#### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Drain 4	P212376-01	Water	10/07/02 10:32	12/19/02 12:30
Drain 6	P212376-02	Water	10/07/02 10:44	12/19/02 12:30
Drain 11	P212376-03	Water	10/07/02 10:52	12/19/02 12:30
Drain 4	P212376-04	Water	12/04/02 10:03	12/19/02 12:30
Drain 6	P212376-05	Water	12/04/02 10:11	12/19/02 12:30
HAFA ADAI HOTEL	P212376-06	Water	12/04/02 10:32	12/19/02 12:30
DAI ICMI HOTEL	P212376-07	Water	12/04/02 10:40	12/19/02 12:30



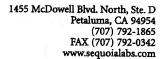


2850 Paa Street, Suite 212 Honolulu HI, 96819 Project: Saipan AES

Project Number: F01009
Project Manager: Matt Neal

P212376 Reported: 01/27/03 12:02

Analyte		Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Drain 4 (P212376-01)	Water	Sampled: 10/07/0	2 10:32	Received: 12	/19/02 12	:30				o report	170
Barium		27	0.50	10	ug/l	1	2120840	12/31/02	01/02/03	EPA 6020	
Mercury		0.048	0.0070	0.20	11	**	2120641	01/02/03	01/03/03	EPA 7470A	J, HT-05
Antimony		2.2	0.55	5.0	**	ıı	2120840	12/31/02	01/02/03	EPA 6020	1,111
Arsenic		ND	1.3	5.0	"	11	11	11	01/06/03	н	•
Beryllium		ND	0.89	4.0	u	11	**	u .	01/02/03	u	
Cadmium		2.1	0.13	0.50	"		"	11	п	u	
Chromium		17	0.65	10	**	н	11	и =	"	11	
Copper		33	0.48	10		**		**	**	,,	
Lead		15	0.21	3.0	H		н		11		
Nickel		15	0.48	10		**	44	11	н		
Selenium		2.4	1.4	5.0	17	n		11		**	J
Silver		ND	0.12	1.0	н	H	н	**	**	н	•
Thallium		ND	0.23	2.0	v	**		# =	**	**	
Zinc		170	2.8	20	"		11		01/06/03	n	
Drain 6 (P212376-02)	Water	Sampled: 10/07/02	2 10:44	Received: 12/	19/02 12	:30					
Barium		17	0.50	10	ug/l	1	2120840	12/31/02	01/02/03	EPA 6020	
Mercury		0.017	0.0070	0.20	п	"	2120641	01/02/03	01/03/03	EPA 7470A	J, HT-05
Antimony		1.2	0.55	5.0	н	0.1	2120840	12/31/02	01/02/03	EPA 6020	J
Arsenic		ND	1.3	5.0	н	11	"	n	01/06/03	н	
Beryllium		ND =	0.89	4.0	11	11	n	n i	01/02/03	"	
Cadmium		1.3	0.13	0.50	**	**	19		Ħ	н	
Chromium		2.7	0.65	10	**	**		н	u	н	- aay
Copper		18	0.48	10	н	11	11	w		**	8.5
		8.9	0.21	3.0	n	"	**	и	u	11	
Lead		6.4	0.48	10		"		и	"		J
		0.7					H		,,		
Lead Nickel Selenium		3.6	1.4	5.0	**	"			••	"	T
Nickel			1.4 0.12	5.0 1.0	"	"		11	n	"	J
Nickel Selenium		3.6									J



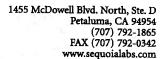


2850 Paa Street, Suite 212 Honolulu HI, 96819 Project: Saipan AES

Project Number: F01009
Project Manager: Matt Neal

P212376 Reported: 01/27/03 12:02

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Drain 11 (P212376-03) Water	Sampled: 10/07	//02 10:52	Received: 1	2/19/02 1	2:30	1		=	<u>.</u> . II	
Barium	26	0.50	10	ug/l	1	2120840	12/31/02	01/02/03	EPA 6020	
Mercury	0.026	0.0070	0.20		<u>.</u> .	2120641	01/02/03	01/03/03	EPA 7470A	J, HT-05
Antimony	4.6	0.55	5.0	**		2120840	12/31/02	01/02/03	EPA 6020	J
Arsenic	ND	1.3	5.0	**	11 11	**	н ′	01/06/03	н	
Beryllium	ND	0.89	4.0	**	*1	11	4	01/02/03	H	
Cadmium	2.2	0.13	0.50	"	н	ij	**		u	
Chromium	28	0.65	10	11 -	H.	"		tt .		
Copper	71	0.48	10	"	"	n 🖷 .	H [	IT.	u	
Lead	40	0.21	3.0	n	н	н	rt r	H	n .	
Nickel	14	0.48	10	"	**	**	11	11	,	
Selenium	ND	1.4	5.0	**	"	**		**	u	
Silver	ND	0.12	1.0	19	n	н	U	"	H	
Thallium	ND	0.23	2.0	**	Ħ	11	IF	**	*1	
Zinc	160	2.8	20	**	**	**	11	01/06/03	**	
Drain 4 (P212376-04) Water	Sampled: 12/04/	02 10:03	Received: 12	/19/02 12	:30					
Barium	74	0.50	10	ug/l	1	2120840	12/31/02	01/03/03	EPA 6020	
Mercury	0.15	0.0070	0.20	11	"	2120641	01/02/03	01/03/03	EPA 7470A	J, HT-04
Antimony	3.3	0.55	5.0	11	0	2120840	12/31/02	01/03/03	EPA 6020	J
Arsenic	11	1.3	5.0	"	н	н	u	01/07/03	•	
Beryllium	ND	0.89	4.0	11	H	*1	tr.	01/03/03	H	
Cadmium	5.2	0.13	0.50		**		W ()	u	**	
Chromium	40	0.65	10		II	n ii		u	**	
Copper	57	0.48	10	10	u	11	11	**	н	
Lead	36	0.21	3.0	10	n	н ,	11	11	*1	
Nickel	51	0.48	10	11	<u>≓</u> n	11	п	tt	**	
Selenium	6.1	1.4	5.0	11	,н	0	11	#	#1	
Silver	ND	0.12	1.0	11	u		H (A)	**	н	
Thallium	0.44	0.23	2.0			и ,	n	**	н	J
Zinc	290	2.8	20			**	n .= 1	01/07/03		,



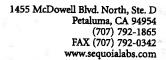


2850 Paa Street, Suite 212 Honolulu HI, 96819 Project: Saipan AES

Project Number: F01009
Project Manager: Matt Neal

P212376 Reported: 01/27/03 12:02

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Drain 6 (P212376-05) Water	Sampled: 12/04/	02 10:11	Received: 12/	/19/02 12	2:30			1		H
Barium	14	0.50	10	ug/l	- 1	2120840	12/31/02	01/03/03	EPA 6020	- 14
Mercury	0.015	0.0070	0.20	10	**	2120641	01/02/03	01/03/03	EPA 7470A	J, HT-04
Antimony	1.2	0.55	5.0	"		2120840	12/31/02	01/03/03	EPA 6020	J
Arsenic	ND	1.3	5.0	19	n	11	0.00	01/07/03	"	
Beryllium	ND	0.89	4.0	"	tr	u II	tr .	01/03/03	v	
Cadmium	1.2	0.13	0.50	11	17	n	11	"	*	
Chromium	2.0	0.65	10	U	*1	11		11	n	J
Copper	11	0.48	10	l <del>e</del>	n	**		11	11	
Lead	4.0	0.21	3.0	11	**	"	# TE	,,	11	
Nickel	4.5	0.48	10		R	н	н	H	n	J
Selenium	ND	1.4	5.0		**	**	II I	11	n	
Silver	ND	0.12	1.0	l†	le le	**	11		•	
Thallium	ND	0.23	2.0	l#	n	**	н		n	
Zinc	64	2.8	20	11		н	11	01/07/03		
HAFA ADAI HOTEL (P2123	76-06) Water Sa	ampled: 1	2/04/02 10:32	Receiv	ed: 12/19/0	2 12:30				
Barium	11	0.50	10	ug/l	1	2120840	12/31/02	01/03/03	EPA 6020	-
Mercury	ND	0.0070	0.20	и	#	2120641	01/02/03	01/03/03	EPA 7470A	HT-04
Antimony	0.85	0.55	5.0	11	n	2120840	12/31/02	01/03/03	EPA 6020	J
Arsenic	91	2.7	10	н	2		11	01/24/03	0	
Beryllium	ND	0.89	4.0	11	1	n	(1	01/03/03	11	
Cadmium	1.1	0.13	0.50	u	**	н	11	rt	tr	
Chromium	ND	0.65	10		Ħ	11	11	и	u	
Copper	14	0.48	10	11	**		"	11	H	
Lead	0.69	0.21	3.0	н	•		n		#	J
Nickel	27	0.48	10	**	ıı	11	**	"		·
Selenium	ND	1.4	5.0	9	н	<b>\$1</b>	н	11	**	
Silver	ND	0.12	1.0	"	*1		u		н	
Thallium	ND	0.23	2.0	11	u		ti		11	
Zinc	69	2.8	20	**		н	n	01/07/03	91	





2850 Paa Street, Suite 212 Honolulu HI, 96819 Project: Saipan AES

Project Number: F01009
Project Manager: Matt Neal

P212376 Reported: 01/27/03 12:02

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
DAI ICMI HOTEL (P212376-	07) Water Sam	pled: 12/04/	02 10:40	Received	12/19/02	12:30		14 H		
Barium	14	0.50	10	ug/l	1	2120840	12/31/02	01/03/03	EPA 6020	
Mercury	0.020	0.0070	0.20	11	10	2120641	01/02/03	01/03/03	EPA 7470A	HT-04, J
Antimony	0.93	0.55	5.0			2120840	12/31/02	01/03/03	EPA 6020	J
Arsenic	110	2.7	10		2	**	II .	01/24/03	"	
Beryllium	ND	0.89	4.0	n	1		n	01/03/03	11	
Cadmium	0.67	0.13	0.50	11	11		11		n	
Chromium	ND	0.65	10		**	**	и	H	Ħ	
Copper	22	0.48	10			12	н		н	
Lead	0.95	0.21	3.0	**	<sub>II</sub> u	**	11	n	n	J
Nickel	31	0.48	10	11	Ħ	0	a ==	**	n	
Selenium	130	1.4	5.0	Ħ	•	**	n .	н	**	
Silver	ND	0.12	1.0	•	"	**	11	n		
<b>Thallium</b>	ND	0.23	2.0	n	n	**	•	n	n	
Zinc	82	2.8	20	19		"	**	01/07/03	u	



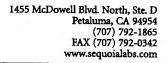


2850 Paa Street, Suite 212 Honolulu HI, 96819 Project: Saipan AES

Project Number: F01009
Project Manager: Matt Neal

P212376 Reported: 01/27/03 12:02

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2120641 - EPA 7470A			==		S			3 54:			
Blank (2120641-BLK1)					Prepared:	01/02/03	Analyze	1: 01/03/03		Y	9.8%
Mercury	ND	0.0070	0.20	ug/l							
Laboratory Control Sample (212064	1-BS1)				Prepared:	01/02/03	Analyzeo	i: 01/03/03			
Mercury	1.71	0.0070	0.20	ug/l	1.60		107	80-120			
Matrix Spike (2120641-MS1)		Source	P212372-	02	Prepared:	01/02/03	Analyzed	i: 01/03/03			
Mercury	1.32	0.0070	0.20	ug/l	1.60	0.065	78	80-120			QM-07
Matrix Spike (2120641-MS2)		Source	P212415-	01	Prepared:	01/02/03	Analyzed	l: 01/03/03			•
Mercury	1.63	0.0070	0.20	ug/l	1.60	0.035	100	80-120			
Matrix Spike Dup (2120641-MSD1)		Source:	P212372-	02	Prepared:	01/02/03	Analyzed	1: 01/03/03			
Mercury	1.40	0.0070	0.20	ug/l	1.60	0.065	83	80-120	6	20	<u> </u>
Matrix Spike Dup (2120641-MSD2)		Source:	P212415-	01	Prepared:	01/02/03	Analyzed	l: 01/03/03			
Mercury	1.69	0.0070	0.20	ug/l	1.60	0.035	103	80-120	4	20	
Batch 2120840 - EPA 3010A											
Blank (2120840-BLK1)					Prepared:	12/31/02	Analyzed	l: 01/02/03			
Antimony	ND	0.55	5.0	ug/l							
Barium	0.883	0.50	10	**							j
Arsenic	ND	1.3	5.0	11							
Beryllium	ND	0.89	4.0	11							
Cadmium	0.379	0.13	0.50								j
Chromium	5.05	0.65	10	10							
Copper	5.58	0.48	10	10							J
Lead	ND	0.21	3.0	10							•
Nickel	2.07	0.48	10	**							J
Selenium	ND	1.4	5.0	**							•
Silver	ND	0.12	1.0	**							
Thallium	ND	0.23	2.0	н							
Zinc	6.26	2.8	20	11							J



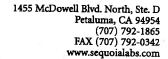


2850 Paa Street, Suite 212 Honolulu HI, 96819 Project: Saipan AES

Project Number: F01009
Project Manager: Matt Neal

P212376 Reported: 01/27/03 12:02

			Reporting		Spike	Source		%REC		RPD	
Analyte	Result	MDL	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 2120840 - EPA 3010A										-10	
Laboratory Control Sample (21208	40-BS1)		-		Prepared:	12/31/02	Analyzed	I: 01/03/03		,	
Antimony	471	0.55	5.0	ug/l	500		94	80-120			
Barium	463	0.50	10	н	500		93	80-120			
Arsenic	492	1.3	5.0	11	500		98	80-120			
Beryllium	46.9	0.89	4.0	. "	50.0		94	80-120			
Cadmium	52.8	0.13	0.50	"	50.0		106	80-120			
Chromium	506	0.65	10	**	500		101	80-120			
Copper	451	0.48	10	11	500		90	80-120			
Lead	524	0.21	3.0	, 11	500		105	80-120			
Nickel	489	0.48	10	H	500		98	80-120			
Selenium	586	1.4	5.0	11	500		117	80-120			
Silver	51.4	0.12	1.0	n	50.0		103	80-120			
Thallium	532	0.23	2.0	н	500		106	80-120			
Zinc	527	2.8	20	11	500		105	80-120			
Matrix Spike (2120840-MS1)		Source:	P212349-	03	Prepared:	12/31/02	Analyzed	: 01/03/03			
Antimony	472	0.55	5.0	ug/l	500	1.0	94	80-120			
Barium	- 588	0.50	10	- 11 .	500	170	84	80-120			
Arsenic	495	1.3	5.0	If	500	6.3	98	80-120			
Beryllium	44.6	0.89	4.0	19	50.0	ND	89	80-120			
Cadmium	56.6	0.13	0.50	10	50.0	0.79	112	80-120			
Chromium	498	0.65	10	**	500	2.2	99	80-120			
Copper	399	0.48	10	H	500	ND	80	80-120			
Lead	517	0.21	3.0		500	ND	103	80-120			
Nickel	424	0.48	10	ıı	500	4.8	84	80-120			
Selenium	610	1.4	5.0		500	1.4	122	80-120			QM-07
Silver	50.7	0.12	1.0	"	50.0	ND	101	80-120			<b>4</b> 01
<b>Tha</b> llium	519	0.23	2.0	10	500	ND	104	80-120			
Zinc	540	2.8	20	U	500	6.6	107	80-120			



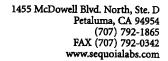


2850 Paa Street, Suite 212 Honolulu HI, 96819 Project: Saipan AES

Project Number: F01009
Project Manager: Matt Neal

P212376 Reported: 01/27/03 12:02

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2120840 - EPA 3010A						-					
Matrix Spike Dup (2120840-MSD1)		Source	: P212349-	03	Prepared:	12/31/02	Analyzed	01/03/03	. 11	•	
Antimony	484	0.55	5.0	ug/l	500	1.0	97	80-120	3	20	
Barium	628	0.50	10		500	170	92	80-120	7	20	
Arsenic	493	1.3	5.0	**	500	6.3	97	80-120	0.4	20	
Beryllium	46.2	0.89	4.0	11	50.0	ND	92	80-120	4	20	
Cadmium	53.8	0.13	0.50	11	50.0	0.79	106	80-120	5	20	
Chromium	499	0.65	10	11	500	2.2	99	80-120	0.2	20	
Copper	433	0.48	10	"	500	ND	87	80-120	8	20	
Lead	502	0.21	3.0	н	500	ND	100	80-120	3	20	
Nickel	475	0.48	10		500	4.8	94	80-120	11	20	
Selenium	572	1.4	5.0	**	500	1.4	114	80-120	6	20	
Silver	49.3	0.12	1.0	**	50.0	ND	99	80-120	3	20	
Thallium	510	0.23	2.0	**	500	ND	102	80-120	2	20	
Zinc	517	2.8	20	17	500	6.6	102	80-120	4	20	





Project Number: F01009
Project Manager: Matt Neal

P212376 Reported: 01/27/03 12:02

#### Notes and Definitions

HT-04 This sample was analyzed beyond the EPA recommended holding time. The results may still be useful for their intended purpose.

HT-05 This sample was requested to be analyzed beyond the EPA recommended holding time. The results may be useful for their

intended purpose.

J Estimated value.

QM-07 The spike recovery was outside control limits for the MS and/or MSD. The batch was accepted based on acceptable LCS

recovery.

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference

Sequoia Analytical - Petaluma

Chain	of (	Ju	st	0	dy						Page _	of ]
Environet, Inc.	•				P	·	Ana	lyses	Requir	ed		
2850 Paa Street, Suite 212, Honolulu,		9			1						T	1
Ph: (808) 833-2225 Fax: (808) 833 Project Name/Number	3-2231		<u> </u>		Jacob		ı					
SAIPAN AER FOIR	209				000		_					
Sampler(s) Name (Print) Sampler(s) Signa	ature		_	-	7	3						ners
		Matri	<u> </u>	True	-125	ी . र्				1 1		ntain
Sample Identification Number Date T	Time S		Other	Comp	Other	Barium						No. of Containers
1 DRAIN 4 10-7-02 10	035	×	×		X	K	<b>P</b> 2	2	3710.			11
2 DWid 4 10-7-02 10	244	X	×		X	1				之		
3 DRDiN 11 10.7.02 10	) <u>5</u> 2	Y	×		X	1			_	3		,
4 Dasir 4 12-4-02 10	03	K	×		X	X			بر			
5 DOBIP 6 12-4-62 10	011	Y	K		X	X			.+<	7		1;
6 HAFA ADAL HOTEL 12-4-02 10	132	×	X		X	X			-6			Ti
7 DAI ICMI HUTEL 124-00 10	940	X	X		人	X	1		-17			1
8	,								7			-
9		П										1
10												
11												1
12			1							1 1		
13			1									
14				П								<del> </del>
15										1 1		1
16 COOLER CUSTODY SEALS INTA	ACT									1 1		
NOT INTACT		П										1
18 COOLER TEMPERATURE	· °	C										
19			1							1 1		
20			1		1							
								Tot	al No. of C	ontainers	(this page	<b>f</b> (:
Special Instructions:  ALL SAMPLES TESTED FOR	M 15	0	A . C	. W 7	r 74	Pet	Tot	al No.	of Contai	17		
									-		3 ARI	יריז ע
PLEASE PROVIDE ESTIMATE	50 "J	*i	FL	۸(	(ED	VA	LUES	FOR	ww	Œ	/EL	
DETECTIONS, Relinquished by (Print/Signature):	<del></del>	Date		Time	Receiv	ed by (I	Print/Signatu	-a)·		I Det		Pi
me (cas)	<u> </u>		7		- Access	ou oy (I	. mv signatu	16 <i>)</i> .		Date		l'ime
Relinquished by (Print/Signature):		Date	_	Time	Receiv	ed by (F	rint/Signatu	re):	···	Date	•   -	îme
Relinquished by (Print/Signature):	I	Date	1	Γime	Receiv	ed by L	aboratory (P	rint/Sign	ature):	Date	, 1	îme
					J ×	qui	llon			12/9	2 12	-3()

C.2
Lagoon Sediment Physical and Chemical Parameters

#### APPENDIX C.2

#### LAGOON SEDIMENT PHYSICAL AND CHEMICAL PARAMETERS

Increasing development along the shoreline of Saipan Lagoon has led to an increase in the introduction of potentially toxic pollutants to the lagoon. The Water and Environmental Research Institute of the Western Pacific (WERI) initiated a pollution monitoring and assessment program for the northern half of Saipan Lagoon (Tanapag Lagoon) in 1997 and identified heavy metals as the contaminants of primary concern in this area (Denton et al., 2009; 2008; 2006; 2001).

Sediments are often an accumulation point for potentially toxic organic and inorganic chemicals introduced into an aquatic environment (Ingersoll, 1995). Analytical data derived from sediment samples is often more useful than that from water samples because of the more immobile nature of sediment. Analysis of sediments can yield data that lends valuable insight as to the nature of contaminants entering the aquatic ecosystem from onshore pollutant sources.

As part of an effort to characterize the general distribution and abundance of pollutants in sediments in the study area, a total of 18 surface sediment samples were collected from the lagoon bottom in September 2002. Samples were collected from six transects extending from nearshore to the outer lagoon, stretching the entire length of the study area. The starting point for each transect was established at storm drains 1 (Dai Ichi Hotel), 4 (13 Fisherman Memorial), 7 (Gold Beach Hotel), 11 (China House Restaurant), and 13 (Quartermaster Road) located along the shoreline of the study area as well as a wetland location adjacent to storm drain 14 (Figure C.2).

Each transect included a sample location within the nearshore *Enhalus* beds, within the nearshore *Halodule* band, and within off-shore *Enhalus* beds located beyond the channel. These sampling locations were estimated to be at 250 meters (m), 500 m, and 1000 m from shore. Samples consisted of a composite of surface sediments collected from three discrete locations around each transect point. Each sediment sample was analyzed for priority pollutant metals, polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs), as well as specific PCB congeners known to be found north of the study area in the Tanapag area during the WERI study.

Table C.3, Table C.4, Table C.5, and Table C.6 summarize analytical results for metals, PCBs, PAHs, and PCB congeners, respectively. The final two numerals of each sample number indicate the specific location of the sample. The first of the final two numerals indicates which of the six transects was sampled. The second numeral indicates whether the sample was collected from the nearshore *Enhalus* bed (1), the nearshore *Halodule* band (2), or the seaward, off-shore *Enhalus* bed (3). Laboratory analytical reports for the sediment samples are included at the end of this report.

As a non-regulatory comparison, analytical results of sediment samples were compared to the EPA regional screening levels (RSLs) for residential soil (EPA, 2012). Overall metals concentrations detected in lagoon sediment were low, but analytical results indicate that in general, sediment collected from the nearshore contained slightly higher concentrations of metals

than those samples collected from mid to off-shore locations. Concentrations of arsenic exceeded the EPA RSL for residential soil in some or all of the locations for all six transects. Concentrations of arsenic detected in samples ranged from 5.1 to 12 milligrams per kilogram (mg/kg), compared to the residential RSL of 0.39 mg/kg.

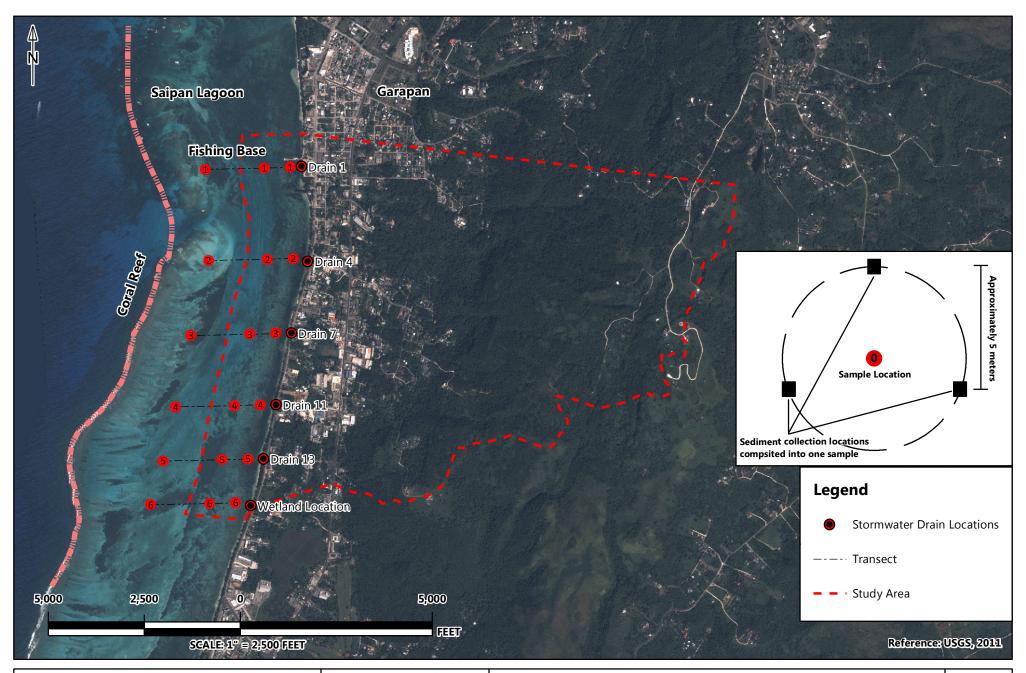
PCBs, PAHs, and PCB congeners were not detected in any of the samples above the laboratory reporting limits. All laboratory reporting limits were below the EPA RSLs except for benzo(a)anthracene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene.

More recent data characterizing the sediment composition of Saipan Lagoon are available from a study conducted by Denton and Starmer (2009) in which sediment samples for heavy metals analysis were collected from 16 of 22 coastal stormwater discharge points that currently exist along the southern half of the lagoon. Surface sediments were collected at offshore locations at 0 m, 10 m, 25 m, 50 m, 100 m, and 250 m from shore along transect lines perpendicular to the discharge points. Samples were also collected from 500 m and 1,000 m offshore where possible. Geometric means were calculated at each distance and the minimum and maximum concentrations were determined. Table C.7 provides a summary of data collected by Denton and Starmer (2009).

Metals concentrations found in surface sediment samples collected in 2009 were all below the EPA RSL, and were similar to those found in sediment samples collected in 2002. The units for the 2002 data are mg/kg and the 2009 data units are micrograms per gram ( $\mu$ g/g), which are comparable without conversions. There are some differences between the metals concentrations found in 2002 and 2009, however these do not follow any major trends and are not significant enough to draw any conclusions.

The maximum concentration of copper in samples collected at 250 m offshore in 2009 (6.47  $\mu g/g$ ) was higher than the maximum concentration of copper found in samples collected at 250 m offshore in 2002 (1.6 mg/kg). The maximum concentration of mercury in samples collected at 250 m (0.1  $\mu g/g$ ) and 500 m (0.0558  $\mu g/g$ ) offshore in 2009 was also higher than the maximum concentration of mercury in samples collected at 250 m (0.015 mg/kg) and 500 m (0.025 mg/kg) offshore in 2002. In addition, the overall range of chromium detected in all samples collected (i.e., samples collected at 250 m, 500 m, and 1,000 m offshore) in 2002 (4.4 to 8.5 mg/kg) were higher than the range in concentration of chromium found in samples collected at 250 m, 500 m, and 1,000 m offshore during 2009 (1.48 to 3.86  $\mu g/g$ ). The maximum concentration of zinc in samples collected at 500 m (2.9 mg/kg) and 1,000 m (2.1 mg/kg) offshore in 2002 was also higher than those collected at 500 m (0.4  $\mu g/g$ ) and 1,000 m (0.4  $\mu g/g$ ) offshore in 2009. The differences of these metal concentrations detected in 2002 and 2009 are likely due to different sample locations that were included in each study.

The 2009 data collection found the highest levels of metals in sediment samples close to shore, as opposed to those collected further offshore. This is in agreement with findings from the 2002 data collection and appears to support the theory that urban runoff is one of the major contributing sources for metal contamination in the lagoon sediment.



- PiEn	víron	et,	Inc.
		,	

PROJECT NO.: 1057	ECOSYSTEM RESTORATION REPORT	
DATE: SEPTEMBER 20, 2012	SAIPAN LAGOON AQUATIC ECOSYSTEM RESTORATION STUDY	FIGURE
DRAWN BY: CB	LAGOON SEDIMENT SAMPLE LOCATIONS	C.2
REVIEWED BY: MA	SAIPAN, CNMI	

Table C.3: Lagoon Sediment Composite Sample Metals Analytical Summary, 2002

	Sample Location	GPS	Date	Time	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Tin	Zinc
		EPA RSL			0.39	70	NL*	3,100	400	10	1,500	390	47,000	23,000
ct 1	F01009LS1,3	0361280, 1682181	9/17/02	1220	14U	1.4U	5.5	1.4U	10U	0.018J	4.1U	14U	29J	2.1J
Transect 1	F01009LS1,2	0361500, 1682134	9/17/02	1239	10J	1.5U	5.3	1.5U	11U	0.025J	1.8U	15U	25J	2.3J
Tra	F01009LS1,1	0361699, 1682071	9/17/02	1245	12U	1.2U	6.7	1.6	9.1U	0.015J	3.7U	12U	46	3.3
t 2	F01009LS2,3	0361284, 1680184	9/17/02	1300	13U	1.3U	5.6	1.3U	9.8U	0.0064J	3.9U	13U	22J	2J
Transect 2	F01009LS2,2	0361636, 1680199	9/17/02	1315	13U	1.3U	5.8	1.3U	9.7U	0.0049J	1.1U	13U	61	1.6J
Tra	F01009LS2,1	0361732, 1680202	9/17/02	1325	7.7J	1.2U	4.5	1.2U	9.2U	0.01J	1.2J	12U	14J	1.8J
it 3	F01009LS3,3	0361222, 1679888	9/17/02	1340	13U	1.3U	6	1.3U	9.6U	0.0098J	3.8U	13U	45U	1J
Transect 3	F01009LS3,2	0361574, 1679809	9/17/02	1350	14U	1.4U	5.3	1.4U	11U	0.012J	1.2J	14U	31J	2.9
Tra	F01009LS3,1	0361750, 1679808	9/17/02	1400	6.4J	1.2U	7.3	1.6	9U	0.011J	1J	12U	51	4
t 4	F01009LS4,3	0361079, 1679483	9/17/02	1415	6.4J	1.3U	5.3	1.3U	9.4U	0.0054J	3.8U	13U	40J	1.2J
Transect 4	F01009LS4,2	0361515, 1679463	9/17/02	1430	<b>5.7</b> J	1.3U	4.6	1.3U	9.7U	0.005J	3.9U	13U	61	1.4J
Tra	F01009LS4,1	0361669, 1679442	9/17/02	1445	<b>6</b> J	1.2U	7.7	1J	8.9U	0.0072J	3.6U	12U	19J	2.6
t 5	F01009LS5,3	0360676, 1678799	9/17/02	1500	5.1J	1.2U	4.5	1.2U	9.2U	0.004J	1.1J	12U	46	0.75J
Transect 5	F01009LS5,2	0361190, 1678636	9/17/02	1510	8.3	1.1U	5.1	1.1U	8.5U	0.0071J	3.4U	11U	48	0.97J
Tra	F01009LS5,1	0361421, 1678585	9/17/02	1520	12J	1.5U	8.5	1.3J	12U	0.0087J	4.6U	15U	17J	2.8J
t 6	F01009LS6,3	0360315, 1677817	9/17/02	1540	12U	1.2U	4.6	1.2U	9.2U	0.0058J	3.7U	5.8U	27Ј	1.5J
Transect 6	F01009LS6,2	0360968, 1677575	9/17/02	1550	<b>5.6</b> J	1.4U	4.4	1.4U	10U	0.0062J	4.1U	14U	64	1.7J
Tra	F01009LS6,1	0361124, 1677509	9/17/02	1605	7.2J	1.4U	5.4	1.4	10U	0.0058J	1.2J	14U	66	2.4J

Notes:

All units in mg/kg.

<sup>\*</sup> EPA RSL for total chromium is not listed. RSLs for chromium(III) and chromium (IV) are 120,000 mg/kg and 0.29 mg/kg, respectively.

<sup>-</sup> EPA RSL (EPA, 2012): US Environmental Protection Agency Regional Screening Levels, Residential Soil, updated May 2012.

<sup>-</sup> A value followed by "U" indicates that the analyte was not detected at or above the reporting limit.

<sup>- &</sup>quot;J" indicates estimated value.

<sup>-</sup> Bold values exceed the EPA RSL.

Table C.4: Lagoon Sediment Composite Sample PCBs Analytical Summary, 2002

	Sample Location	Date	Time	PCB-1016	PCB-1221	PCB-1232	PCB-1242	PCB-1248	PCB-1254	PCB-1260
		EPA RSL		3.9	0.14	0.14	0.22	0.22	0.22	0.22
t 1	F01009LS1,3	9/17/02	1220	0.045U						
Transect 1	F01009LS1,2	9/17/02	1239	0.051U						
Tra	F01009LS1,1	9/17/02	1245	0.043U						
t 2	F01009LS2,3	9/17/02	1300	0.043U						
Transect	F01009LS2,2	9/17/02	1315	0.043U						
Tra	F01009LS2,1	9/17/02	1325	0.045U						
st 3	F01009LS3,3	9/17/02	1340	0.045U						
Transect 3	F01009LS3,2	9/17/02	1350	0.053U						
Tra	F01009LS3,1	9/17/02	1400	0.043U						
t 4	F01009LS4,3	9/17/02	1415	0.044U						
Transect 4	F01009LS4,2	9/17/02	1430	0.044U						
Tra	F01009LS4,1	9/17/02	1445	0.043U						
it 5	F01009LS5,3	9/17/02	1500	0.042U						
Transect	F01009LS5,2	9/17/02	1510	0.041U						
Tra	F01009LS5,1	9/17/02	1520	0.051U						
it 6	F01009LS6,3	9/17/02	1540	0.045U						
Transect 6	F01009LS6,2	9/17/02	1550	0.053U						
Tra	F01009LS6,1	9/17/02	1605	0.052U						

Notes:

All units in mg/kg.

<sup>-</sup> EPA RSL (EPA, 2012): US Environmental Protection Agency Regional Screening Levels, Residential Soil, updated May 2012.

<sup>-</sup> A value followed by "U" indicates that the analyte was not detected at or above the reporting limit.

Table C.5: Lagoon Sediment Composite Sample PAHs Analytical Summary, 2002

	Sample Location	Date	Time	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)- anthracene	Benzo(b+k)- fluoranthene	Benzo(g,h,i)- pyrene	Benzo(a)-pyrene	Chrysene	Dibenz(a,h)- anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)- pyrene	Naphthalene	Phenanthrene	Pyrene
	EPA	A RSL		3,400	NL	17,000	0.15	1.65	NL	0.015	15	0.015	2,300	2,300	0.15	3.6	NL	1,700
1.1	F01009LS1,3	9/17/02	1220	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U
Transect 1	F01009LS1,2	9/17/02	1239	0.51U	0.51U	0.51U	0.51U	0.51U	0.51U	0.51U	0.51U	0.51U	0.51U	0.51U	0.51U	0.51U	0.51U	0.51U
Tra	F01009LS1,1	9/17/02	1245	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U
x 2	F01009LS2,3	9/17/02	1300	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U
Transect	F01009LS2,2	9/17/02	1315	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U
Tra	F01009LS2,1	9/17/02	1325	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U
3 3 x	F01009LS3,3	9/17/02	1340	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U
Transect 3	F01009LS3,2	9/17/02	1350	0.53U	0.53U	0.53U	0.53U	0.53U	0.53U	0.53U	0.53U	0.53U	0.53U	0.53U	0.53U	0.53U	0.53U	0.53U
Tra	F01009LS3,1	9/17/02	1400	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U
t 4	F01009LS4,3	9/17/02	1415	0.44U	0.44U	0.44U	0.44U	0.44U	0.44U	0.44U	0.44U	0.44U	0.44U	0.44U	0.44U	0.44U	0.44U	0.44U
Transect 4	F01009LS4,2	9/17/02	1430	0.44U	0.44U	0.44U	0.44U	0.44U	0.44U	0.44U	0.44U	0.44U	0.44U	0.44U	0.44U	0.44U	0.44U	0.44U
Tra	F01009LS4,1	9/17/02	1445	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U	0.43U
t 5	F01009LS5,3	9/17/02	1500	0.42U	0.42U	0.42U	0.42U	0.42U	0.42U	0.42U	0.42U	0.42U	0.42U	0.42U	0.42U	0.42U	0.42U	0.42U
Transect	F01009LS5,2	9/17/02	1510	0.41U	0.41U	0.41U	0.41U	0.41U	0.41U	0.41U	0.41U	0.41U	0.41U	0.41U	0.41U	0.41U	0.41U	0.41U
Tra	F01009LS5,1	9/17/02	1520	0.51U	0.51U	0.51U	0.51U	0.51U	0.51U	0.51U	0.51U	0.51U	0.51U	0.51U	0.51U	0.51U	0.51U	0.51U
t 6	F01009LS6,3	9/17/02	1540	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U	0.45U
Transect	F01009LS6,2	9/17/02	1550	0.53U	0.53U	0.53U	0.53U	0.53U	0.53U	0.53U	0.53U	0.53U	0.53U	0.53U	0.53U	0.53U	0.53U	0.53U
Notes	F01009LS6,1	9/17/02	1605	0.52U	0.52U	0.52U	0.52U	0.52U	0.52U	0.52U	0.52U	0.52U	0.52U	0.52U	0.52U	0.52U	0.52U	0.52U

All units in mg/kg.
- EPA RSL (EPA, 2012): US Environmental Protection Agency Regional Screening Levels, Residential Soil, updated May 2012.
- A value followed by "U" indicates that the analyte was not detected at or above the reporting limit.

Table C.6: Lagoon Sediment Composite Sample PCB Congeners Analytical Summary, 2002

			PCB Congeners (µg/kg)																			
	Sample ID	Date	8	18	28	44	52	66	77	101	105	118	126	128	138	153	170	180	187	195	206	209
1	LS1,3	9/17/02	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U
sect	LS1,2	9/17/02	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U
Transect 1	LS 1,1	9/17/02	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U
2	LS 2,3	9/17/02	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U
ect	LS 2,2	9/17/02	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U
Transect	LS 2,1	9/17/02	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U
3	LS 3,3	9/17/02	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U
ect	LS 3,2	9/17/02	2.6U	2.6U	2.6U	2.6U	2.6U	2.6U	2.6U	2.6U	2.6U	2.6U	2.6U	2.6U	2.6U	2.6U	2.6U	2.6U	2.6U	2.6U	2.6U	2.6U
Transect	LS 3,1	9/17/02	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U
4	LS 4,3	9/17/02	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U
ect	LS 4,2	9/17/02	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U
Transect	LS 4,1	9/17/02	2.3U	2.3U	2.3U	2.3U	2.3U	2.3U	2.3U	2.3U	2.3U	2.3U	2.3U	2.3U	2.3U	2.3U	2.3U	2.3U	2.3U	2.3U	2.3U	2.3U
5	LS 5,3	9/17/02	2.1U	2.1U	2.1U	2.1U	2.1U	2.1U	2.1U	2.1U	2.1U	2.1U	2.1U	2.1U	2.1U	2.1U	2.1U	2.1U	2.1U	2.1U	2.1U	2.1U
sect	LS 5,2	9/17/02	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U
Transect	LS 5,1	9/17/02	2.7U	2.7U	2.7U	2.7U	2.7U	2.7U	2.7U	2.7U	2.7U	2.7U	2.7U	2.7U	2.7U	2.7U	2.7U	2.7U	2.7U	2.7U	2.7U	2.7U
9	LS 6,3	9/17/02	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U	2.2U
sect	LS 6,2	9/17/02	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U
Transect	LS 6,1 Notes:	9/17/02	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U	2.5U

Notes

<sup>-</sup> A value followed by "U" indicates that the analyte was not detected at or above the reporting limit.

Table C.7: Lagoon Surface Sediment Metals Analytical Summary, 2009

Distance from Storm Drain (m)	Statistic	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Nickel	Silver	Zinc
EPA	RSL	70	NL*	3,100	55,000	400	1,800	10	1,500	390	23,000
0	Range	<0.19-0.79	0.72-8.28	0.59-50.7	82.9-6,664	0.39-31	2.38-364	0.00357-0.0805	0.38-6.23	all <0.2	2.75-98.5
	Mean	NC	4.13	2.87	660	3.67	19.3	0.0137	0.65	NC	11.5
10	Range	<0.19-0.4	1.27-10.2	0.2-53.8	57-4,077	0.39-45.2	2.38-81.5	0.00059-0.103	0.38-3.53	all <0.2	0.39-82
	Mean	NC	3.89	1.25	430	2.38	11.7	0.00682	0.5	NC	5.12
25	Range	<0.19-0.6	2-9.36	0.2-16.5	61.8-4,437	0.39-45.7	2.58-92.6	0.00059-0.0791	0.38-3.53	all <0.2	0.2-67.6
	Mean	NC	4.1	1.3	446	1.79	12.9	0.0113	0.49	NC	3.8
50	Range	all <0.2	2.59-7.35	0.19-6.51	50.3-2,840	0.39-7.11	2.19-67.1	0.00238-0.0597	0.38-2.71	all <0.2	0.19-18.8
	Mean	NC	3.83	0.76	384	0.74	11.1	0.0102	0.52	NC	1.76
100	Range	all <0.2	2.04-5.12	<0.2-2.94	50-1,221	0.39-4.8	2.35-39.9	0.00115-0.13	0.38-1.57	all <0.2	<0.19-7.45
	Mean	NC	3.47	0.51	259	0.52	10.1	0.0071	0.43	NC	0.68
250	Range	all <0.2	1.85-3.86	<0.19-6.47	31-300	0.39-2.8	1.38-31.2	0.0012-0.1	all <0.4	all <0.2	<0.19-3.4
	Mean	NC	2.93	0.25	102	0.44	4.3	0.0065	NC	NC	0.34
500	Range	all <0.2	1.82-3.24	<0.19-0.4	22.9-127	all <0.4	0.99-7.75	0.00071-0.0558	all <0.4	all <0.2	<0.19-0.4
500	Mean	NC	2.58	0.22	57.1	NC	1.9	0.00554	NC	NC	0.21
1000	Range	all <0.2	1.48-3.39	all <0.2	21-62.6	all <0.4	1.18-7.55	0.00056-0.0134	all <0.4	all <0.2	<0.19-0.4
	Mean	NC	2.26	NC	46	NC	1.98	0.00171	NC	NC	NC

Notes:
All units in µg/g.
NC = not calculated
\* EPA RSL for total chromium is not listed. RSLs for chromium(III) and chromium (IV) are 120,000 mg/kg and 0.29 mg/kg, respectively.
- EPA RSL (EPA, 2012): US Environmental Protection Agency Regional Screening Levels, Residential Soil, updated May 2012.

#### REFERENCES

- Denton, G.R.W., B.G. Bearden, L.P. Concepcion, H.G. Siegrist, D.T. Vann, and H. R. Wood, 2001. Contaminant Assessment of Surface Sediments from Tanapag Lagoon, Saipan. Water and Environmental Research Institute (WERI) of the Western Pacific Technical Report No. 93, 110 pp. plus appendices.
- Denton, G.R.W., B.G. Bearden, L.P. Concepcion, H.R. Wood, and R.J. Morrison, 2006. Contaminant Assessment of Surface Sediments from Tanapag Lagoon, Saipan, Commonwealth of the Northern Mariana Islands. *Marine Pollution Bulletin*, 52: 696-710.
- Denton G.R.W., B.G. Bearden, P. Houk, and H.R. Wood, 2008. Heavy Metals in Biotic Representatives from the Intertidal Zone and Nearshore Waters of Tanapag Lagoon, Saipan, Commonwealth of the Northern Mariana Islands (CNMI). Water and Environmental Research Institute (WERI) of the Western Pacific Technical Report No. 123, 50 pp.
- Denton, G.R.W. and J.A. Starmer, 2009. Influence of Stormwater and Wastewater Discharges on the Distribution and Abundance of Heavy Metals in Sediments from Saipan Lagoon. Water and Environmental Research Institute of the Western Pacific Annual Technical Report FY 2009.
- Denton, G.R.W., R.J. Morrison, B.G. Bearden, P. Houk, and J.A, Starmer, 2009. Impact of a Coastal Dump in a Tropical Lagoon on Trace Metal Levels in Surrounding Marine Biota: A Case Study from Saipan, Northern Mariana Islands (CNMI). *Marine Pollution Bulletin*, 58:424-455.
- EPA, 2012. Regional Screening Levels for Chemical Contaminants at Superfund Sites. EPA Office of Superfund. May.
- Ingersoll, C.G.. 1995. Sediment Toxicity Tests. Fundamentals of Aquatic Toxicology, 2nd edition, Rand GM (ed.), Taylor and Francis, Washington, DC, pp. 231-255.



October 14, 2002

Matt Neal Environet, Inc. 2850 Paa Street, Suite 212 Honolulu, HI 96819 RE: Saipan AES / P209468

Enclosed are the results of analyses for samples received by the laboratory on 09/24/02. If you have any questions concerning this report, please feel free to contact me.

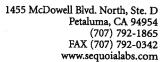
Sincerely,

Angelee Cari Project Manager

CA ELAP Certificate Number 2374

Alle Cari

Page 1 of 37



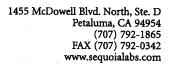


Project: Saipan AES
Project Number: [none]
Project Manager: Matt Neal

P209468 Reported: 10/14/02 18:10

#### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
F01009LS 1,3	P209468-01	Soil	09/17/02 12:20	09/24/02 10:30
F01009LS 1,2	P209468-02	Soil	09/17/02 12:39	09/24/02 10:30
F01009LS 1,1	P209468-03	Soil	09/17/02 12:45	09/24/02 10:30
F01009LS 2,3	P209468-04	Soil	09/17/02 13:00	09/24/02 10:30
F01009LS 2,2	P209468-05	Soil	09/17/02 13:15	09/24/02 10:30
F01009LS 2,1	P209468-06	Soil	09/17/02 13:25	09/24/02 10:30
F01009LS 3,3	P209468-07	Soil	09/17/02 13:40	09/24/02 10:30
F01009LS 3,2	P209468-08	Soil	09/17/02 13:50	09/24/02 10:30
F01009LS 3,1	P209468-09	Soil	09/17/02 14:00	09/24/02 10:30
F01009LS 4,3	P209468-10	Soil	09/17/02 14:15	09/24/02 10:30
F01009LS 4,2	P209468-11	Soil	09/17/02 14:30	09/24/02 10:30
F01009LS 4,1	P209468-12	Soil	09/17/02 14:45	09/24/02 10:30
F01009LS 5,3	P209468-13	Soil	09/17/02 15:00	09/24/02 10:30
F01009LS 5,2	P209468-14	Soil	09/17/02 15:10	09/24/02 10:30
F01009LS 5,1	P209468-15	Soil	09/17/02 15:20	09/24/02 10:30
F01009LS 6,3	P209468-16	Soil	09/17/02 15:40	09/24/02 10:30
F01009LS 6,2	P209468-17	Soil	09/17/02 15:50	09/24/02 10:30
F01009LS 6,1	P209468-18	Soil	09/17/02 16:05	09/24/02 10:30





Project Number: [none]
Project Manager: Matt Neal

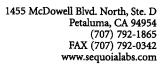
P209468 Reported: 10/14/02 18:10

#### Total Metals by EPA 6000/7000 Series Methods Sequoia Analytical - Petaluma

· · · · · · · · · · · · · · · · · · ·										
Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009LS 1,3 (P209468-01) Soil	Sampled: 09	/17/02 12:20	Receive	d: 09/24/02	10:30			14		
Arsenic	ND	4.8	14	mg/kg dry	1	2090740	10/03/02	10/09/02	EPA 6010B	
Cadmium	ND	0.38	1.4	44	11	11	n	11	•	
Chromium	5.5	0.22	1.4		**	**	11	"	11	
Copper	ND	0.94	1.4		11	н	**	"	и	
Mercury	0.018	0.00076	0.025	If	11	2090710	10/06/02	10/09/02	EPA 7471A	J
Nickel	ND	1.0	4.1	11	H	2090740	10/03/02	10/09/02	EPA 6010B	
Lead	ND	1.7	10	"	17	"	**	"	n	
Selenium	ND	6.4	14	11	**	"	**	"	H.	
Tin	29	8.4	48	"	11	н	11	11	11	J
Zinc	2.1	0.54	2.7	**	н	"	H .	"	"	J
F01009LS 1,2 (P209468-02) Soil	Sampled: 09	/17/02 12:39	Receive	d: 09/24/02	10:30					
Arsenic	10	5.3	15	mg/kg dry	1	2090740	10/03/02	10/09/02	EPA 6010B	
Cadmium	ND	0.42	1.5	"	11	**	n	11	"	_
Chromium	5.3	0.24	1.5		**	"	"		**	
Copper	ND	1.0	1.5	11	n	II u	**	11	**	
Mercury	0.025	0.00084	0.028			2090710	10/06/02	10/09/02	EPA 7471A	J
Nickel	1.8	1.2	4.5	1		2090740	10/03/02	10/09/02	EPA 6010B	J
Lead	ND	1.8	11	**	"	"	11	11	11	
Selenium	ND	7.2	15	11	н	n	**	11	**	
Tin	25	9.3	53	11	"	n	"	11	**	J
Zinc	2.3	0.61	3.0	"	II.	H	"	**	"	J
F01009LS 1,1 (P209468-03) Soil	Sampled: 09	/17/02 12:45	Receive	d: 09/24/02	10:30					
Arsenic	ND	4.3	12	mg/kg dry	1	2090740	10/03/02	10/09/02	EPA 6010B	2:
Cadmium	ND	0.34	1.2	"	"	**	11	"	"	
Chromium	6.7	0.19	1.2	**		11	**	"	11	
Copper	1.6	0.84	1.2	н	н	"	**	**	O .	
Mercury	0.015	0.00068	0.023	н		2090710	10/06/02	10/09/02	EPA 7471A	J
Nickel	ND	0.94	3.7	"	n	2090740	10/03/02	10/09/02	EPA 6010B	
Lead	ND	1.5	9.1	"	11	"	10.05.02	"	"	
Selenium	ND	5.8	12	•	11	u u	"	n	11	
Tin	46	7.5	43	"	11	11	u .	"		
Zinc	3.3	0.49	2.4		11	11	n	#1	n	

Sequoia Analytical - Petaluma





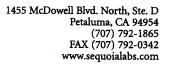


Project Number: [none]
Project Manager: Matt Neal

P209468 Reported: 10/14/02 18:10

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009LS 2,3 (P209468-04) Soil	Sampled: 09	/17/02 13:00	Receive	d: 09/24/02	10:30	11 =	Ä			
Arsenic	ND	4.6	13	mg/kg dry	1	2090740	10/03/02	10/09/02	EPA 6010B	
Cadmium	ND	0.37	1.3	"	**	#	"	11	"	
Chromium	5.6	0.21	1.3	"	**	Ħ	"	11	11	
Copper	ND	0.90	1.3	**	**	"	"	11	"	
Mercury	0.0064	0.00072	0.024	"	**	2090710	10/06/02	10/09/02	EPA 7471A	
Nickel	ND	1.0	3.9	н	**	2090740	10/03/02	10/09/02	EPA 6010B	
Lead	ND	1.6	9.8	Ħ	•	11	11	11	a a	
Selenium	ND	6.2	13	Ħ	**	11	11	н	**	
Tin	22	8.1	46	н	**	II	"	"	**	
Zinc	2.0	0.52	2.6	**	**	n	"	н	19	
F01009LS 2,2 (P209468-05) Soil	Sampled: 09	/17/02 13:15	Receive	d: 09/24/02	10:30					
Arsenic	ND	4.5	13	mg/kg dry	1	2090740	10/03/02	10/09/02	EPA 6010B	
Cadmium	ND	0.36	1.3	"	**	11	"	tt.	**	
Chromium	5.8	0.21	1.3	"	*1	11	**	**	"	
Copper	ND	0.89	1.3	"	n	**	"	0	**	
Mercury	0.0049	0.00072	0.024	"	H	2090710	10/06/02	10/09/02	EPA 7471A	
Nickel	1.1	0.99	3.9	"	н	2090740	10/03/02	10/09/02	EPA 6010B	
Lead	ND	1.6	9.7	"	"		Ħ		#	
Selenium	ND	6.1	13	"	"		"	"	н	
Tin	61	8.0	45	"	n	"	11		**	
Zinc	1.6	0.52	2.6	"	11	**	u	11	"	
F01009LS 2,1 (P209468-06) Soil	Sampled: 09	/17/02 13:25	Receive	d: 09/24/02	10:30					
Arsenic	7.7	4.3	12	mg/kg dry	1	2090740	10/03/02	10/09/02	EPA 6010B	
Cadmium	ND	0.34	1.2	"			"	11	n	
Chromium	4.5	0.20	1.2	,,	**	"	11	"		
Copper	ND	0.85	1.2	"	n I	**	11	н		
Mercury	0.010	0.00078	0.026	**		2090710	10/06/02	10/09/02	EPA 7471A	
Nickel	1.2	0.95	3.7	11	"	2090740	10/03/02	10/09/02	EPA 6010B	
Lead	ND	1.5	9.2	11	**	"	11	н	"	
Selenium	ND	5.8	12	н	**		11		н	
Tin	14	7.6	43	**	**		**	"		
Zinc	1.8	0.49	2.5	11	**		**			- 1







Project Number: [none]
Project Manager: Matt Neal

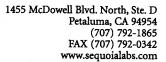
P209468 Reported: 10/14/02 18:10

#### Total Metals by EPA 6000/7000 Series Methods Sequoia Analytical - Petaluma

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009LS 3,3 (P209468-07) Soil	Sampled: 09	/17/02 13:40	Receive	d: 09/24/02	10:30				1 2 )	
Arsenic	ND	4.5	13	mg/kg dry	1	2090740	10/03/02	10/09/02	EPA 6010B	
Cadmium	ND	0.36	1.3	Ħ	"	"	**	"		
Chromium	6.0	0.20	1.3	11	н	"	11	"	u	
Copper	ND	0.88	1.3	н	11	"	"	"	H	
Mercury	0.0098	0.00068	0.023	Ħ	11	2090710	10/06/02	10/09/02	EPA 7471A	
Nickel	ND	0.98	3.8	"	H	2090740	10/03/02	10/09/02	EPA 6010B	
Lead	ND	1.6	9.6	11		"		n	**	
Selenium	ND	6.0	13	11		"		11	**	
Tin	ND	7.9	45	ū		**	"	u	"	
Zinc	1.0	0.51	2.6	"	11	**	"	"	**	
F01009LS 3,2 (P209468-08) Soil	Sampled: 09	/17/02 13:50	Receive	d: 09/24/02	10:30					
Arsenic	ND	5.0	14	mg/kg dry	1	2090740	10/03/02	10/09/02	EPA 6010B	
Cadmium	ND	0.40	1.4	"	"	**	"	"	•	
Chromium	5.3	0.23	1.4	"		**	"	n .	**	
Copper	ND	0.99	1.4	"	и	**		11	11	
Mercury	0.012	0.00096	0.032	"	н	2090710	10/06/02	10/09/02	EPA 7471A	
Nickel	1.2	1.1	4.3	11	**	2090740	10/03/02	10/09/02	EPA 6010B	
Lead	ND	1.8	11	"		"	**	11	11	
Selenium	ND	6.8	14	"	11	**	**	**	11	
Tin	31	8.9	50	"	**	11	<u></u>	Ħ	**	
Zinc	2.9	0.58	2.9	n	11	"	"	11	n	
F01009LS 3,1 (P209468-09) Soil	Sampled: 09	/17/02 14:00	Receive	d: 09/24/02	10:30					
Arsenic	6.4	4.2	12	mg/kg dry	1	2090740	10/03/02	10/09/02	EPA 6010B	±°.
Cadmium	ND	0.34	1.2	"	tt	11	11	n	H .	
Chromium	7.3	0.19	1.2	II .	**		11	"	11	
Copper	1.6	0.83	1.2	"	11	u	**	11	11	
Mercury	0.011	0.00076	0.025	n.,	**	2090710	10/06/02	10/09/02	EPA 7471A	
Nickel	1.0	0.92	3.6	u	11	2090740	10/03/02	10/09/02	EPA 6010B	
Lead	ND	1.5	9.0	11	11	11	**	11	n	
Selenium	ND	5.7	12	<b>u</b> []	111	11		u	**	
Tin	51	7.4	42	"	11	"	II .	u	n	
Zinc	4.0	0.48	2.4	11					,,	

Sequoia Analytical - Petaluma



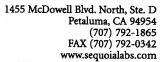




Project Number: [none]
Project Manager: Matt Neal

P209468
Reported:
10/14/02 18:10

-										
Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009LS 4,3 (P209468-10) Soil	Sampled: 09	/17/02 14:15	Receive	d: 09/24/02	10:30	Ų.	-			l.
Arsenic	6.4	4.4	13	mg/kg dry	1	2090740	10/03/02	10/09/02	EPA 6010B	J
Cadmium	ND	0.35	1.3	"	**	"	п	"	"	
Chromium	5,3	0.20	1.3	**	**	"	"	"	"	
Copper	ND	0.86	1.3	11	H =	n	**	"	10	
Mercury	0.0054	0.00067	0.022	11		2090710	10/06/02	10/09/02	EPA 7471A	J
Nickel	ND	0.96	3.8	11	**	2090740	10/03/02	10/09/02	EPA 6010B	
Lead	ND	1.5	9.4	"	11	"	11	11	"	
Selenium	ND	5.9	13	н	н	"	11	**	и	
Tin	40	7.7	44	"	n	"	11	11	и	J
Zinc	1.2	0.50	2.5	u	**	n	**	**	**	J
F01009LS 4,2 (P209468-11) Soil	Sampled: 09	/17/02 14:30	Receive	d: 09/24/02	10:30					
Arsenic	5.7	4.5	13	mg/kg dry	1	2090740	10/03/02	10/09/02	EPA 6010B	J
Cadmium	ND	0.36	1.3	11	н		11	11	n	
Chromium	4.6	0.21	1.3	u	n .		1)	**		
Copper	ND	0.89	1.3	н	11	•	**	**	•	
Mercury	0.0050	0.00072	0.024	н	**	2090710	10/06/02	10/09/02	EPA 7471A	- J
Nickel	ND	0.99	3.9	"	11	2090740	10/03/02	10/09/02	EPA 6010B	
Lead	ND	1.6	9.7	**	n	"	11	11	"	
Selenium	ND	6.1	13		н	"	"	11	п	
Tin	61	7.9	45	tr .	11	"	"	"	**	
Zinc	1.4	0.51	2.6	"	"	**	n	ıı	ıı	J
F01009LS 4,1 (P209468-12) Soil	Sampled: 09	/17/02 14:45	Receive	d: 09/24/02	10:30					
Arsenic	6.0	4.2	12	mg/kg dry	1	2090740	10/03/02	10/09/02	EPA 6010B	J
Cadmium	ND	0.33	1.2	"	"	- "	**	***	11	
Chromium	7.7	0.19	1.2	"	"	**	н	**	11	
Copper	1.0	0.82	1.2	11	"		11	**	ıı	J
Mercury	0.0072	0.00075	0.025	"	"	2090710	10/06/02	10/09/02	EPA 7471A	ı J
Nickel	ND	0.92	3.6	**	н	2090740	10/03/02	10/09/02	EPA 6010B	
Lead	ND	1.4	8.9	11	11	11	"	"	"	
Selenium	ND	5.6	12	**	tr	n	ıı	#	"	
Tin	19	7.3	42	11	"	11	11	н		J
Zinc	2.6	0.48	2.4	11	11	11	**	11	ų	•
	_		_, ,							

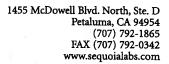




Project Number: [none]
Project Manager: Matt Neal

P209468
Reported:
10/14/02 18:10

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Note
F01009LS 5,3 (P209468-13) Soil	Sampled: 09	/17/02 15:00	Receive	d: 09/24/02	10:30		9			
Arsenic	5.1	4.3	12	mg/kg dry	1	2090740	10/03/02	10/09/02	EPA 6010B	
Cadmium	ND	0.34	1.2	11		**	0	11	"	
Chromium	4.5	0.20	1.2	**	"	H	**	11	**	
Copper	ND	0.84	1.2	11	**	11	н	11	11	
Mercury	0.0040	0.00071	0.024	H (4)		2090710	10/06/02	10/09/02	EPA 7471A	
Nickel	1.1	0.94	3.7	"	11	2090740	10/03/02	10/09/02	EPA 6010B	
Lead	ND	1.5	9.2		**		"	"		
Selenium	ND	5.8	12	"	**	**	**	"	11	
Γin	46	7.5	43	"	11		"	11	Ħ	
Zinc	0.75	0.49	2.4	"	11	"	n	11	н	
F01009LS 5,2 (P209468-14) Soil	Sampled: 09	/17/02 15:10	Receive	d: 09/24/02	10:30					
Arsenic	8.3	4.0	11	mg/kg dry	1	2090740	10/03/02	10/09/02	EPA 6010B	
Cadmium	ND	0.32	1.1	11	11	**	11	11	"	
Chromium	5.1	0.18	1.1	**	11	Ħ	11	11	**	
Copper	ND	0.79	1.1	11	"	11	11	11	**	
Mercury	0.0071	0.00063	0.021	**	11	2090710	10/06/02	10/09/02	EPA 7471A	
Nickel	ND	0.88	3.4	11	"	2090740	10/03/02	10/09/02	EPA 6010B	
Lead	ND	1.4	8.5	"	"	*1	Ħ	"	11	
Selenium	ND	5.4	11	**	"	ii tt	Ħ	н	**	
<b>Tin</b>	48	7.0	40	**		**	11	#	11	
Zinc	0.97	0.46	2.3	"	11	11	11	11	H	
F01009LS 5,1 (P209468-15) Soil	Sampled: 09	/17/02 15:20	Receive	d: 09/24/02	10:30					
Arsenic	12	5.4	15	mg/kg dry	1	2090740	10/03/02	10/09/02	EPA 6010B	112
Cadmium	ND	0.43	1.5	H			**	n	"	
Chromium	8.5	0.25	1.5	"			"	tt	11	
Copper	1.3	1.1	1.5	"		/ H	**	n	н	
Mercury	0.0087	0.00088	0.029	"		2090710	10/06/02	10/09/02	EPA 7471A	
Nickel	ND	1.2	4.6			2090740	10/03/02	10/09/02	EPA 6010B	
Lead	ND	1.9	12	11		**	11	11	11	
Selenium	ND	7.3	15	11	**	**	11	11	11	
<b>Tin</b>	17	9.5	54	11		н	**	**	11	
Zinc	2.8	0.62	3.1	**		,,	**	"		



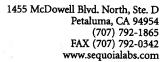


2850 Paa Street, Suite 212 Honolulu HI, 96819 Project: Saipan AES

Project Number: [none]
Project Manager: Matt Neal

P209468
Reported:
10/14/02 18:10

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009LS 6,3 (P209468-16) Soil	Sampled: 09	/17/02 15:40	Receive	d: 09/24/02	10:30		The	2.		
Arsenic	ND	4.3	12	mg/kg dry	1	2090740	10/03/02	10/09/02	EPA 6010B	
Cadmium	ND	0.34	1.2	11	"		17	н	11	
Chromium	4.6	0.20	1.2	u	**	н	17	н	**	
Copper	ND	0.85	1.2	11	"		II.	ti .	11	
Mercury	0.0058	0.00082	0.027	11	"	2090710	10/06/02	10/09/02	EPA 7471A	
Nickel	ND	0.94	3.7	H (II)	"	2090740	10/03/02	10/09/02	EPA 6010B	
Lead	ND	1.5	9.2	ir .	**	11	**		"	
Selenium	ND	5.8	12	lt.	11	n	"	"	"	
Tin	27	7.6	43	n	"	**	"			J
Zinc	1.5	0.49	2.5	"	•	**	"		11	
F01009LS 6,2 (P209468-17) Soil	Sampled: 09	/17/02 15:50	Receive	d: 09/24/02	10:30	3	-	211-		
Arsenic	5.6	4.7	14	mg/kg dry	1	2090740	10/03/02	10/09/02	EPA 6010B	
Cadmium	ND	0.38	1.4	11	"	n	e u	"	11	
Chromium	4.4	0.22	1.4	41		n	u	**	11	
Copper	ND	0.93	1.4	11	"	. "	"	"	11	
Mercury	0.0062	0.00093	0.031	11	"	2090710	10/06/02	10/09/02	EPA 7471A	j
Nickel	ND	1.0	4.1	11	II .	2090740	10/03/02	10/09/02	EPA 6010B	
Lead	ND	1.6	10	n	"	11	"	a	"	
Selenium	ND	6.4	14		"	tt	"	"	"	
Tin	64	8.3	47	11	"	n	"		"	
Zinc	1.7	0.54	2.7	11	11	n		u	u .	= 3
F01009LS 6,1 (P209468-18) Soil	Sampled: 09	/17/02 16:05	Receive	d: 09/24/02	10:30					
Arsenic	7.2	4.9	14	mg/kg dry	1	2090740	10/03/02	10/09/02	EPA 6010B	J
Cadmium	ND	0.39	1.4	"	"	, n	. "	"	Ħ	
Chromium	5.4	0.22	1.4	n			"	"	н	
Copper	1.4	0.96	1.4	11	"	11	y #	"	tt	
Mercury	0.0058	0.00083	0.028	11	"	2090710	10/06/02	10/09/02	EPA 7471A	= 3
Nickel	1.2	1.1	4.2	Ħ		2090740	10/03/02	10/09/02	EPA 6010B	J
Lead	ND	1.7	10	11		= n	_ "		tr	•
Selenium	ND	6.6	14	n	**	n	"		•	
Tin	66	8.6	49	n		n n				
Zinc	2.4	0.56	2.8	n	**	11			H	J



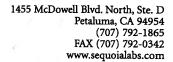


2850 Paa Street, Suite 212 Honolulu HI, 96819 Project: Saipan AES

Project Number: [none]
Project Manager: Matt Neal

P209468
Reported:
10/14/02 18:10

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009LS 1,3 (P209468-01) Soil	Sampled: 09/17	/02 12:20	Receive	1: 09/24/02	10:30	=		10		C-01, C-06
PCB-1016	ND		45	ug/kg dry	1	2090779	09/30/02	10/02/02	EPA 8082	
PCB-1221	ND		45	"	"		11	**		
PCB-1232	ND		45	"	11	11	**	n		
PCB-1242	ND		45	11	11	"	10	Ħ	**	
PCB-1248	ND		45		11	**	"	11	tt	
PCB-1254	ND		45	11	"	97	**	и	Ħ	
PCB-1260	ND		45	**		11	11	11	и	
Surrogate: Decachlorobiphenyl		51 %	46-1	15		"	"	"	"	
F01009LS 1,2 (P209468-02) Soil	Sampled: 09/17	/02 12:39	Receive	i: 09/24/02	10:30	9.1				C-01, C-06
PCB-1016	ND		51	ug/kg dry	1	2090779	09/30/02	10/02/02	EPA 8082	
PCB-1221	ND		51	11	"	"		11	11	
PCB-1232	ND		51	"	n	**	"	**	"	
PCB-1242	ND		51	"	n		**	**	"	
PCB-1248	ND		51	n	11	"	**	11	n	
PCB-1254	ND		51		**	**	11	**	**	
PCB-1260	ND		51	"	Ħ	11	**	"	11	
Surrogate: Decachlorobiphenyl		37 %	46-1	15		"	"	#	"	S-LIM
F01009LS 1,2 (P209468-02RE1) S	Soil Sampled: 0	9/17/02 12	2:39 Rec	eived: 09/2	4/02 10:3	0 11 11	P1	-	1	C-01, C-06
PCB-1016	ND		51	ug/kg dry	1	2100154	09/30/02	10/07/02	EPA 8082	d E
PCB-1221	ND		51	"		н	"	**	11	
PCB-1232	ND		51	"		"	"	11	11	
PCB-1242	ND		51	н		H		u	11	
PCB-1248	ND		51	11		11		**	**	
PCB-1254	ND		51	"	**	**	"	**	н	, Y
PCB-1260	ND		51	n y	"	11	n n	"	11	
Surrogate: Decachlorobiphenyl		<i>78</i> %	46-1	15		"	"	"	"	



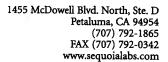


2850 Paa Street, Suite 212 Honolulu HI, 96819 Project: Saipan AES

Project Number: [none]
Project Manager: Matt Neal

P209468
Reported:
10/14/02 18:10

Analyte	Result MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009LS 1,1 (P209468-03) Soil	Sampled: 09/17/02 12:45	Receive	d: 09/24/02	10:30	. 11	TAX			C-01, C-06
PCB-1016	ND	43	ug/kg dry	1	2090779	09/30/02	10/02/02	EPA 8082	
PCB-1221	ND	43	н	n	**	· u	11	**	
PCB-1232	ND	43	н	H	•		**	**	
PCB-1242	ND	43	H	19	11		11	m.	
PCB-1248	ND	43	11	41	**	**			
PCB-1254	ND	43	**	**	**	"	•	n	
PCB-1260	ND	43	и ,	**	**	ı ıı	n	n	
Surrogate: Decachlorobiphenyl	66 %	46-1	15		"	n	"	"	
F01009LS 2,3 (P209468-04) Soil	Sampled: 09/17/02 13:00	Receive	d: 09/24/02	10:30		10			C-01, C-06
PCB-1016	ND	43	ug/kg dry	1	2090779	09/30/02	10/02/02	EPA 8082	
PCB-1221	ND	43	"	.,	**	. "	"	11	
PCB-1232	ND	43	III	II.	**	"	11	n	
PCB-1242	ND	43	<b>n</b> ,	"	**	**		"	
PCB-1248	ND	43	**		H	"		"	
PCB-1254	ND	43		"	н	"	"		
PCB-1260	ND	43	"	"	"	H	n	**	
Surrogate: Decachlorobiphenyl	66 %	46-1	15	10 - 10	"	"	"	"	
F01009LS 2,2 (P209468-05) Soil	Sampled: 09/17/02 13:15	Receive	d: 09/24/02	10:30	. ]				C-01, C-06
PCB-1016	ND	43	ug/kg dry	1	2090779	09/30/02	10/02/02	EPA 8082	
PCB-1221	ND	43	11	17	**	"	II .	11	
PCB-1232	ND	43	**	0	"	"	**	**	
PCB-1242	ND	43	11	**	**	п	**	u u	
PCB-1248	ND	43	· . I	"	n	"	"	n	
PCB-1254	ND	43	n †	н	**		"	"	
PCB-1260	ND	43	"		11	н	"	11	
Surrogate: Decachlorobiphenyl	71 %	46-1	15		"	n	"	"	

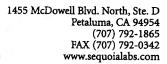




Project Number: [none]
Project Manager: Matt Neal

P209468
Reported:
10/14/02 18:10

Analyte	Result MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009LS 2,1 (P209468-06) Soil	Sampled: 09/17/02 13:25	Receive	d: 09/24/02	10:30	-	V			C-01, C-06
PCB-1016	ND	45	ug/kg dry	1	2090779	09/30/02	10/02/02	EPA 8082	81
PCB-1221	ND	45	n	"	u	**	**	#	
PCB-1232	ND	45	n	**	**	"	"	11	
PCB-1242	ND	45	H	11	n	"	"	n	
PCB-1248	ND	45	If	u	n	"	11	11	
PCB-1254	ND	45	11	11	**	,	u	11	
PCB-1260	ND	45	"		**			"	
Surrogate: Decachlorobiphenyl	50 %	46-1	15	000	n	n	"	"	
F01009LS 3,3 (P209468-07) Soil	Sampled: 09/17/02 13:40	Receive	d: 09/24/02	10:30	- 1777				C-01, C-06
PCB-1016	ND	45	ug/kg dry	1	2090779	09/30/02	10/02/02	EPA 8082	
PCB-1221	ND	45	"	"	н	"	11	**	
PCB-1232	ND	45	u	•	"	"	11	п	
PCB-1242	ND	45	n 17	**	"	H	"	"	
PCB-1248	ND	45	"	"	"	11	11	"	
PCB-1254	ND	45	11	**	"	11	11	11	
PCB-1260	ND	45	11	If	н		11	н	
Surrogate: Decachlorobiphenyl	72 %	46-1	15		"	"	"	"	
F01009LS 3,2 (P209468-08) Soil	Sampled: 09/17/02 13:50	Receive	d: 09/24/02	10:30		111	911		C-01, C-06
PCB-1016	ND	53	ug/kg dry	1	2090779	09/30/02	10/02/02	EPA 8082	
PCB-1221	ND	53	"	"	**	**	n	11	
PCB-1232	ND	53		"	11		"	**	
PCB-1242	ND	53	"	"	н	**	n .	n	
PCB-1248	ND	53		"	"		"	11	
PCB-1254	ND	53	**	"	11	**	ıı	n	
PCB-1260	ND	53	**	11	11	и	u	n	
Surrogate: Decachlorobiphenyl	59 %	46-1	15		"	"	"	"	





Environet, Inc. 2850 Paa Street, Suite 212

Honolulu HI, 96819

Project Number: [none]
Project Manager: Matt Neal

P209468 Reported: 10/14/02 18:10

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009LS 3,1 (P209468-09) Soil	Sampled: 09/17/0	02 14:00	Received	d: 09/24/02	10:30		G	6 5	187 - 975 -	C-01, C-06
PCB-1016	ND		43	ug/kg dry	1	2090779	09/30/02	10/02/02	EPA 8082	
PCB-1221	ND		43	и	Ħ	**	H	**	•	
PCB-1232	ND		43	u	**	"	H	11	11	
PCB-1242	ND		43	u	"	"	11	"	u	
PCB-1248	ND		43	n =	**	"		11	**	
PCB-1254	ND		43	11	11	"	l n	0		
PCB-1260	ND		43	*1	11	u .	"	q	"	
Surrogate: Decachlorobiphenyl		62 %	46-1	15		"	"	"	"	
F01009LS 4,3 (P209468-10) Soil	Sampled: 09/17/0	02 14:15	Received	i: 09/24/02	10:30					C-01, C-06
PCB-1016	ND		44	ug/kg dry	1	2090779	09/30/02	10/02/02	EPA 8082	
PCB-1221	ND		44	H	11	"				
PCB-1232	ND		44	Ħ	"	"	"	**	II .	
PCB-1242	ND		44	11	"			"	u	
PCB-1248	ND		44	11	"		"	"	II .	
PCB-1254	ND		44	11		"	H	"	n .	
PCB-1260	ND		44		11	11	11	"	11	
Surrogate: Decachlorobiphenyl		68 %	46-1	15		"	"	"	"	
F01009LS 4,2 (P209468-11) Soil	Sampled: 09/17/0	2 14:30	Received	1: 09/24/02	10:30		- T			C-01, C-06
PCB-1016	ND		44	ug/kg dry	1	2090779	09/30/02	10/02/02	EPA 8082	
PCB-1221	ND		44	II 🔻	**	"	"	11	"	
PCB-1232	ND		44	11	**		**		W	
PCB-1242	ND		44	11	"	"	**	11	ti	
PCB-1248	ND		44	11	н		n n	**	n	
PCB-1254	ND		44	11	"	11	н	11	11	
PCB-1260	ND		44	**	N	11	11	11		
Surrogate: Decachlorobiphenyl		70 %	46-1	15		"	"	"	"	





Environet, Inc. 2850 Paa Street, Suite 212

Honolulu HI, 96819

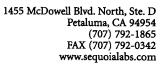
Project: Saipan AES
Project Number: [none]

P209468 Reported: 10/14/02 18:10

#### Polychlorinated Biphenyls by EPA Method 8082 Sequoia Analytical - Petaluma

Project Manager: Matt Neal

Analyte	Result MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009LS 4,1 (P209468-12) Soil	Sampled: 09/17/02 14:45	Receive	d: 09/24/02	10:30				<del> </del>	C-01, C-06
PCB-1016	ND	43	ug/kg dry	1	2090779	09/30/02	10/02/02	EPA 8082	
PCB-1221	ND	43	**			"		"	
PCB-1232	ND	43	11	"	"	"	11	"	
PCB-1242	ND	43	n	n	*	"	"	"	
PCB-1248	ND	43	11		"	"		11	
PCB-1254	ND	43	**	"		n		**	
PCB-1260	ND	43	tt	"	н	"	н	"	
Surrogate: Decachlorobiphenyl	67 %	46-1	15		"	"	"	"	
F01009LS 5,3 (P209468-13) Soil	Sampled: 09/17/02 15:00	Receive	d: 09/24/02	10:30		_			C-01, C-06
PCB-1016	ND	42	ug/kg dry	1	2090779	09/30/02	10/02/02	EPA 8082	
PCB-1221	ND	42	"	11	"	"	11	"	
PCB-1232	ND	42	"	"	•	"	**	"	
PCB-1242	ND	42	11	"	"	"	**	n	
PCB-1248	ND	42	11	"			11	"	
PCB-1254	ND	42	11 👍	"		"	"	11	
PCB-1260	ND	42	**		и	n	ıı	41	
Surrogate: Decachlorobiphenyl	62 %	46-1	15		"	"	"	"	
F01009LS 5,2 (P209468-14) Soil	Sampled: 09/17/02 15:10	Receive	d: 09/24/02	10:30					C-01, C-06
PCB-1016	ND	41	ug/kg dry	1	2090779	09/30/02	10/02/02	EPA 8082	
PCB-1221	ND	41	"	"	**	11	11	**	
PCB-1232	ND	41	11	**	11	**	11	"	
PCB-1242	ND	41	"	**	"	11	11	**	
PCB-1248	ND	41	11	**	**	**	"	**	
PCB-1254	ND	41	U	"	"	11	n	**	
PCB-1260	ND	41	11	"	"	"	11	"	
Surrogate: Decachlorobiphenyl	70 %	46-1	15		"	"	"	"	



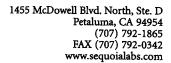


2850 Paa Street, Suite 212 Honolulu HI, 96819 Project: Saipan AES

Project Number: [none]
Project Manager: Matt Neal

P209468 Reported: 10/14/02 18:10

Analyte	Result MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009LS 5,1 (P209468-15) Soil	Sampled: 09/17/02 15:20	Receive	i: 09/24/02	10:30	24 - 2		=		C-01, C-06
PCB-1016	ND	51	ug/kg dry	1	2090779	09/30/02	10/02/02	EPA 8082	
PCB-1221	ND	51	н	11		"		"	
PCB-1232	ND	51	и	**	"	н		"	
PCB-1242	ND	51	"	**			11		
PCB-1248	ND	51	"	11	"	n	н	"	
PCB-1254	ND	51	"	11	n	11	19	"	
PCB-1260	ND	51	"	0	**	11	11	H	
Surrogate: Decachlorobiphenyl	63 %	46-1	15		"	"	"	"	
F01009LS 6,3 (P209468-16) Soil	Sampled: 09/17/02 15:40	Receive	i: 09/24/02	10:30					C-01, C-06
PCB-1016	ND	45	ug/kg dry	1	2090779	09/30/02	10/02/02	EPA 8082	
PCB-1221	ND	45	11	H	**	"	n .	"	
PCB-1232	ND	45	#	н	**	"	n	11	
PCB-1242	ND	45	**	**	**	"	0	"	
PCB-1248	ND	45	11	**	**	"	"	"	
PCB-1254	ND	45	**	н	**	**	"	11	
PCB-1260	ND	45	"	II	91	**	"	11	
Surrogate: Decachlorobiphenyl	66 %	46-1	15		"	"	"	"	
F01009LS 6,2 (P209468-17) Soil	Sampled: 09/17/02 15:50	Received	1: 09/24/02	10:30					C-01, C-06
PCB-1016	ND	53	ug/kg dry	1	2090779	09/30/02	10/02/02	EPA 8082	_
PCB-1221	ND	53	"	**	11	"	"	**	
PCB-1232	ND	53	"	11	11	"	11	"	
PCB-1242	ND	53	**	и	11		11	**	
PCB-1248	ND	53	11	н	"		**	"	
PCB-1254	ND	53	н	11	**	"	11	"	
PCB-1260	ND	53	11		"		**	ıı .	
Surrogate: Decachlorobiphenyl	59 %	46-1	15		"	"	"	"	





Honolulu HI, 96819

2850 Paa Street, Suite 212

Project: Saipan AES

Project Number: [none]

Project Number: [none]
Project Manager: Matt Neal

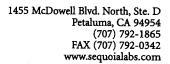
P209468 Reported:

10/14/02 18:10

## Polychlorinated Biphenyls by EPA Method 8082 Sequoia Analytical - Petaluma

Analyte	Result MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009LS 6,1 (P209468-18) Soil	Sampled: 09/17/02 16:05	Received	d: 09/24/02	10:30	"1		X es		C-01, C-06
PCB-1016	ND	52	ug/kg dry	1	2090779	09/30/02	10/02/02	EPA 8082	
PCB-1221	ND	52	и	"	**	**	"		
PCB-1232	ND	52	**	**	**	**	u		
PCB-1242	ND	52	"		11				
PCB-1248	ND	52			**	"	"	"	
PCB-1254	ND	52		11	**	"		erael . H	
PCB-1260	ND	52	"	**	**	ıı ıı		н	
Surrogate: Decachlorobiphenyl	65 %	46-1	15		n	"	"	"	

Sequoia Analytical - Petaluma





Project Number: [none]
Project Manager: Matt Neal

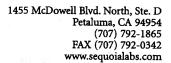
P209468 Reported: 10/14/02 18:10

#### Semivolatile Organic Compounds by EPA Method 8270C Sequoia Analytical - Petaluma

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009LS 1,3 (P209468-01) Soil	Sampled: 09/1	7/02 12:20	Received	l: 09/24/02	10:30				10 10	
Acenaphthene	ND		450	ug/kg dry	1	2090778	09/30/02	10/03/02	EPA 8270C	
Acenaphthylene	ND		450	И	H	"	11	**	**	
Anthracene	ND		450	11	n	"	H	**		
Benzo (a) anthracene	ND		450	"	n	"	11	11	u u	
Benzo (b+k) fluoranthene (total)	ND		450	"	n		11	11	11	
Benzo (g,h,i) perylene	ND		450	**	н	"	**	"	"	
Benzo (a) pyrene	ND		450	er e	11	"	**	н	u	
Chrysene	ND		450	11	н	"	"		"	
Dibenz (a,h) anthracene	ND		450	**	н		11	н	"	
Fluoranthene	ND		450	W .	н		11	"	11	
Fluorene	ND		450	m .	н	11	11	"	n	
Indeno (1,2,3-cd) pyrene	ND		450		н	"	11	"	u u	
Naphthalene	ND		450	"	н	**	11	"	**	
Phenanthrene	ND		450	u	н		11	н		
Ругепе	ND		450	III	19		11	11	H	
Surrogate: Nitrobenzene-d5		74 %	16-1.	26		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		71 %	28-1.	34		n	"	"	"	
Surrogate: Terphenyl-d14		108 %	64-1	19		"	"	n	"	
F01009LS 1,2 (P209468-02) Soil	Sampled: 09/1	7/02 12:39	Received	1: 09/24/02	10:30					
Acenaphthene	ND		510	ug/kg dry	1	2090778	09/30/02	10/04/02	EPA 8270C	
Acenaphthylene	ND		510	n	**	**	"	tt	"	
Anthracene	ND		510	It	11	11	"	**	11	
Benzo (a) anthracene	ND		510	It	"	**	"	**	"	
Benzo (b+k) fluoranthene (total)	ND		510	tt.	n	11	"	11	11	
Benzo (g,h,i) perylene	ND		510	**	"	h	"	11	11	
Benzo (a) pyrene	ND		510	"	"	n	**	**		
Chrysene	ND		510	**	"	**	и	"	11	
Dibenz (a,h) anthracene	ND		510	**		n	11	**	"	
Fluoranthene	ND		510	Ħ	"	11	"	**	11	
Fluorene	ND		510	"	n	**	11	11	· ·	
Indeno (1,2,3-cd) pyrene	ND		510	tt.	"	11	"	11	· ·	
Naphthalene	ND		510	n	"	n	H	11	ų	
Phenanthrene	ND		510	"	"	**	"	**	"	
Ругепе	ND		510	**	11	n .		n	II .	
Surrogate: Nitrobenzene-d5		66 %	16-1.	26		"	"	"	n .	
Surrogate: 2-Fluorobiphenyl		50 %	28-1.	3 <i>4</i>		"	"	"	n	
Surrogate: Terphenyl-d14		85 %		19		"	"	"		

Sequoia Analytical - Petaluma







2850 Paa Street, Suite 212 Honolulu HI, 96819 Project: Saipan AES

Project Number: [none]
Project Manager: Matt Neal

P209468 Reported:

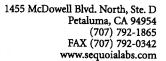
10/14/02 18:10

#### Semivolatile Organic Compounds by EPA Method 8270C Sequoia Analytical - Petaluma

							<del></del>	
Analyte	Result MDL	Reporting  Limit Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009LS 1,1 (P209468-03) Soil	Sampled: 09/17/02 12:45	Received: 09/24/02	10:30				-	11
Acenaphthene	ND	430 ug/kg dry	1	2090778	09/30/02	10/04/02	EPA 8270C	14
Acenaphthylene	ND	430 "	11	11	11	"	11	
Anthracene	ND	430 "	**	**	19	· ·	11	
Benzo (a) anthracene	ND	430 "	**	**	11	n .	11	
Benzo (b+k) fluoranthene (total)	ND	430 "	н	# 1	11	n	11	
Benzo (g,h,i) perylene	ND	430 "	11	**	n	· ·	10	
Benzo (a) pyrene	ND	430 "	**	**	11	· ·	**	
Chrysene	ND	430 "	11	**	11	u	**	
Dibenz (a,h) anthracene	ND	430 "		11	"	u	**	
Fluoranthene	ND	430 "	"		"	11		
Fluorene	ND	430 "	"	11	"	**	"	
Indeno (1,2,3-cd) pyrene	ND	430 "	"	**	"	n	**	
Naphthalene	ND	430 "		**	"	ıı	**	
Phenanthrene	ND	430 "		н	" "	n	н	
Pyrene	ND	430 "	"	n	11	# ONE PER IN ITS	11	
Surrogate: Nitrobenzene-d5	60 %	16-126		"	"	"	n	
Surrogate: 2-Fluorobiphenyl	60 %	28-134		"	**	"	"	
Surrogate: Terphenyl-d14	100 %	64-119			"	"	<i>n</i>	
F01009LS 2,3 (P209468-04) Soil	Sampled: 09/17/02 13:00	Received: 09/24/02	10:30					
Acenaphthene	ND	430 ug/kg dry	1	2090778	09/30/02	10/04/02	EPA 8270C	
Acenaphthylene	ND	430 "		#	11	"	**	
Anthracene	ND	430 "	**	11	**	"	**	
Benzo (a) anthracene	ND	430 "	"	11	"	n		
Benzo (b+k) fluoranthene (total)	ND	430 "	и	•	**	e <b>n</b> g	**	
Benzo (g,h,i) perylene	ND	430 "	н	**	"	"		
Benzo (a) pyrene	ND	430 "	"	н		n	н 🦥	
Chrysene	ND	430 "	H	**	"	"		
Dibenz (a,h) anthracene	ND	430 "	17	**	eg u	n	_ и	
Fluoranthene	ND	430 "	n	**	"	II .	•	
Fluorene	ND	430 "		**	17		**	
Indeno (1,2,3-cd) pyrene	ND	430 "		11	H	п	11	
Naphthalene	ND	430 "	**	н	n	11	п	
Phenanthrene	ND	430 "	***	H		19	H	
Pyrene	ND	430 "	*	и	"	11	"	
Surrogate: Nitrobenzene-d5	76 %	16-126		"	"	"	"	
Surrogate: 2-Fluorobiphenyl	78 %	28-134		- "	"	"	"	
Surrogate: Terphenyl-d14	99 %	64-119		"	"	"		
O		- · - • •						

Sequoia Analytical - Petaluma







2850 Paa Street, Suite 212 Honolulu HI, 96819 Project: Saipan AES

Project Number: [none]
Project Manager: Matt Neal

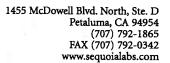
P209468
Reported:
10/14/02 18:10

#### Semivolatile Organic Compounds by EPA Method 8270C Sequoia Analytical - Petaluma

Analyte	Result MDL	Reporting Limit		Dilution	Batch	Prepared	Analyzed	Method	Note
F01009LS 2,2 (P209468-05) Soil	Sampled: 09/17/02 13	15 Receive	d: 09/24/02	10:30	4 4 4		7=		
Acenaphthene	ND	430	ug/kg dry	1	2090778	09/30/02	10/04/02	EPA 8270C	
Acenaphthylene	ND	430	**	11	n	E	11	"	
Anthracene	ND	430	11	11	Ħ		11	"	
Benzo (a) anthracene	ND	430	11	11	**	"	11	**	
Benzo (b+k) fluoranthene (total)	ND	430	11	"	"	n	**	**	
Benzo (g,h,i) perylene	ND	430	n	н	"	"	"	tt	
Benzo (a) pyrene	ND	430	"	H	"	**	**	11	
Chrysene	ND	430	n .	11	"	. "	•	n	
Dibenz (a,h) anthracene	ND	430	"	10	**	"	n .	11	
Fluoranthene	ND	430	11	11	#	u	n	"	
Fluorene	ND	430	н	n	17	"	**	"	
Indeno (1,2,3-cd) pyrene	ND	430	**		**	17	u	**	
Naphthalene	ND	430	II .		*	**	"	fl	
Phenanthrene	ND	430	n	11	"	u		н	
Pyrene	ND	430	"	"	"	11	11	"	
Surrogate: Nitrobenzene-d5	81 %	16-	126		"	"	"	"	
Surrogate: 2-Fluorobiphenyl	81 %	28-	134		"	"	"	"	
Surrogate: Terphenyl-d14	102 %	64-	119		"	"	"	"	
F01009LS 2,1 (P209468-06) Soil	Sampled: 09/17/02 13:	25 Receive	d: 09/24/02	10:30					
Acenaphthene	ND	450	ug/kg dry	1	2090778	09/30/02	10/04/02	EPA 8270C	
Acenaphthylene	ND	450	11	**	**	"	"	11	
Anthracene	ND	450	Ħ	11	**	н	11	11	
Benzo (a) anthracene				**					
	ND	450	n	"	11	"	**		
• •	ND ND	450 450	17 18		"	"	"		
Benzo (b+k) fluoranthene (total)				"				117	
Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene	ND	450	н	"	**	n	**	117	
Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene	ND ND	450 450	н п	11 12	"	11	11	117	
Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene	ND ND ND	450 450 450	н п н	11 11	11 11	11 11	11 11	"	
Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene	ND ND ND ND	450 450 450 450	N 17 11	"""""""""""""""""""""""""""""""""""""""	""	11 11 11	11 11 11	" " " "	
Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene	ND ND ND ND ND	450 450 450 450 450	n n n	" " " " "	11 11 11	11 11 11	11 11 11	" " " "	
Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene Fluorene	ND ND ND ND ND ND	450 450 450 450 450 450	H H H	11 11 11 11	11 11 11 11 11 11 11	11 11 11 11	11 11 11 11	" " " "	
Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene	ND ND ND ND ND ND	450 450 450 450 450 450 450	n n n	11 11 11 11 11 11	11 11 11 11	11 11 11 11	11 11 11 11	" " " "	
Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene Naphthalene	ND ND ND ND ND ND ND	450 450 450 450 450 450 450	H H H H H H H H H H H H H H H H H H H	11 11 11 11 11 11 11 11 11 11 11 11 11	11 11 11 11 11	11 11 11 11	11 11 11 11 11 11 11 11 11 11 11	11 11 11 11 11 11 11 11 11 11 11 11 11	
Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene Naphthalene Phenanthrene	ND ND ND ND ND ND ND ND	450 450 450 450 450 450 450 450	H H H H H H H H H H H H H H H H H H H	" " " " " " " " "	0	" " " " " " " " " " " " " " " " " " "	11 11 11 11 11 11 11 11 11 11 11 11	" " " " " " " "	
Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene Naphthalene Phenanthrene Pyrene	ND	450 450 450 450 450 450 450 450		" " " " " " " " " " " "	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	" " " " " " " " " " " " " " " " " " "	11 11 11 11 11 11	11 11 11 11 11 11 11 11 11 11 11 11 11	8
Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene Fluoranthene Indeno (1,2,3-cd) pyrene Naphthalene Phenanthrene Pyrene Surrogate: Nitrobenzene-d5 Surrogate: 2-Fluorobiphenyl	ND N	450 450 450 450 450 450 450 450 450	"""""""""""""""""""""""""""""""""""""""	" " " " " " " " " " " "	0 0 0 0 0 0 0	11 11 11 11 11	11 11 11 11 11 11 11 11 11 11 11 11 11	" " " " " " " " " "	3

Sequoia Analytical - Petaluma







Project: Saipan AES
Project Number: [none]
Project Manager: Matt Neal

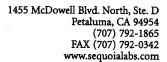
P209468 Reported: 10/14/02 18:10

## Semivolatile Organic Compounds by EPA Method 8270C Sequoia Analytical - Petaluma

			7144	<del></del>	1 Ctara					
Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009LS 3,3 (P209468-07) Soil	Sampled: 09/17	7/02 13:40	Receive	1: 09/24/02	10:30	ii –	pres	0.05		
Acenaphthene	ND		450	ug/kg dry	1	2090778	09/30/02	10/04/02	EPA 8270C	
Acenaphthylene	ND		450	**	11	"	**	11		
Anthracene	ND		450	•	"		n	11	"	
Benzo (a) anthracene	ND		450	"	"	11	"	11	TT 1 - 10 25	
Benzo (b+k) fluoranthene (total)	ND		450	"	**	n	11	10	_ "	
Benzo (g,h,i) perylene	ND		450	"	w	"	"	11	n	
Benzo (a) pyrene	ND		450	"		H	"	11	"	
Chrysene	ND		450	"	"	"	"	11	**	
Dibenz (a,h) anthracene	ND		450	"	"	"	"	D	- "	
Fluoranthene	ND		450	"	11		· · ·	11	**	
Fluorene	ND		450		"	"	ч	**		
Indeno (1,2,3-cd) pyrene	ND		450	"	"	"	H	11		
Naphthalene	ND		450	и 1	"	**	**	"		
Phenanthrene	ND	-	450	н 🤚	"	**		**	,,	
Pyrene	ND		450	u	н	*1	u	11	.,	
Surrogate: Nitrobenzene-d5		70 %	16-1	26		n	"	"	n	
Surrogate: 2-Fluorobiphenyl		72 %	28-1	34		n	"	"	"	
Surrogate: Terphenyl-d14		96 %	64-1	19		"	"	"	n	
F01009LS 3,2 (P209468-08) Soil	Sampled: 09/17	7/02 13:50	Received	1: 09/24/02	10:30					
Acenaphthene	ND		530	ug/kg dry	1	2090778	09/30/02	10/04/02	EPA 8270C	
Acenaphthylene	ND		530	"	n	11	**		**	
Anthracene	ND		530	17	***	**	"	н	11	
Benzo (a) anthracene	ND		530	<b>n</b>	#	**	11		**	
Benzo (b+k) fluoranthene (total)	ND		530	u g	11	11	Ħ	**	"	
Benzo (g,h,i) perylene	ND		530	m	11	11	11	n	u .	
Benzo (a) pyrene	ND		530	n 🧸	н	11	n	*11		
Chrysene	ND		530	**	#	н	19	"	u	
Dibenz (a,h) anthracene	ND		530	и В р	#	11	г и	"	**	
Fluoranthene	ND		530	"	11	11	11	II	11	
Fluorene	ND		530	**	**	**	"		11	
Indeno (1,2,3-cd) pyrene	ND		530	н	n	**		"	I+ I	
Naphthalene	ND		530		n			"	11	
Phenanthrene	ND		530	H 181	11	**	"	"		
Pyrene	ND		530	"	n	•	11			
Surrogate: Nitrobenzene-d5		76 %	16-1	26		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		65 %	28-I			,,	"	"	,,	
Surrogate: Terphenyl-d14		99 %	64- <i>1</i>	_		"	"	,,	"	
San Oguic. 101 phonys-u17		11 10	U <del>7</del> -1	.,						

Sequoia Analytical - Petaluma







Project: Saipan AES

Project Number: [none]
Project Manager: Matt Neal

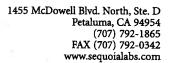
P209468
Reported:
10/14/02 18:10

## Semivolatile Organic Compounds by EPA Method 8270C Sequoia Analytical - Petaluma

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009LS 3,1 (P209468-09) Soil	Sampled: 09/	17/02 14:00	Received	: 09/24/02	10:30		19%	ibez	TT.	
Acenaphthene	ND		430	ug/kg dry	1	2090778	09/30/02	10/04/02	EPA 8270C	
Acenaphthylene	ND		430	II	11		11	**	n	
Anthracene	ND		430	11	Ħ	"	n	**	n	
Benzo (a) anthracene	ND		430	11	11	"	> 11	H	19	
Benzo (b+k) fluoranthene (total)	ND		430	11	11	"	n	"	н	
Benzo (g,h,i) perylene	ND		430	"	"	"	н	n	tt	
Benzo (a) pyrene	ND		430	11	11	**	n	H	#	
Chrysene	ND		430	"	11	11	IT	"	n	
Dibenz (a,h) anthracene	ND		430	**	11	"	n	ï	"	
Fluoranthene	ND		430	"	"	"	n	H	н	
Fluorene	ND		430	11	"	n	ii .	11	11	
Indeno (1,2,3-cd) pyrene	ND		430	"	u	11	"	**	"	
Naphthalene	ND		430	**	"	**	"		"	
Phenanthrene	ND		430	n	11	11	n n	"	···	
Pyrene	ND_		430	P1	11	"	**	"	"	
Surrogate: Nitrobenzene-d5		23 %	16-12	26		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		25 %	28-13	34		"	"	"	""	S-LIM
Surrogate: Terphenyl-d14		35 %	64-1	19		"	"	"	"	S-LIM
F01009LS 3,1 (P209468-09RE1) Sc	il Sampled	09/17/02 14	:00 Rec	eived: 09/2	4/02 10:3	0= 1				HT-03
Acenaphthene	ND		430	ug/kg dry	1	2100198	10/07/02	10/09/02	EPA 8270C	
Acenaphthylene	ND		430	н	11	"	11	**	n	
Anthracene	ND		430	**	**	"	**	**	n	
Benzo (a) anthracene	ND		430	II .	11	"	**	**	•	
Benzo (b+k) fluoranthene (total)	ND		430	11	11	"	"	# <b>#</b> []	II	
Benzo (g,h,i) perylene	ND		430	"	"	"	"	•	"	
Benzo (a) pyrene	ND		430	"	•	"			"	
Chrysene	ND		430	11	II	**	"	"	n	
Dibenz (a,h) anthracene	ND		430	"	•	"	"		"	
Fluoranthene	ND		430	**	"	"	u	· ·		
Fluorene	ND		430	0 34	H	"	**	"	"	
Indeno (1,2,3-cd) pyrene	ND		430	11	II .	**	n	W .		
Naphthalene	ND		430	n =	"	"	11	11	"	
Phenanthrene	ND		430	11	"	"	11	H	"	
Pyrene	ND		430	"		"	- "	tt .	11	
Surrogate: Nitrobenzene-d5		40 %	16-12	26	<del></del>	"	"	"	"	
Surrogate: 2-Fluorobiphenyl		47 %	28-1.	3 <i>4</i>		"	"	#	n	

Sequoia Analytical - Petaluma







Project Number: [none]
Project Manager: Matt Neal

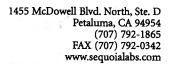
P209468 Reported: 10/14/02 18:10

## Semivolatile Organic Compounds by EPA Method 8270C Sequoia Analytical - Petaluma

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009LS 4,3 (P209468-10) Soil	Sampled: 09/1	7/02 14:15	Received	i: 09/24/02	10:30					, .
Acenaphthene	ND		440	ug/kg dry	1	2090778	09/30/02	10/04/02	EPA 8270C	
Acenaphthylene	ND		440	**	**	**	"	"		
Anthracene	ND		440	**	•	"	**	"	11	
Benzo (a) anthracene	ND		440			н		11		
Benzo (b+k) fluoranthene (total)	ND		440	11	**	H	n	" .	n į	
Benzo (g,h,i) perylene	ND		440	**	**	"	11	"	н	
Benzo (a) pyrene	ND		440	11	**	"	n	**	#	
Chrysene	ND		440	**	**	**	n	H	**	
Dibenz (a,h) anthracene	ND		440	11	**	11	н	11	"	
Fluoranthene	ND		440		"	H	11	n	n	
Fluorene	ND		440		**	H		H	n	
Indeno (1,2,3-cd) pyrene	ND		440	tt	"	H		11	н	
Naphthalene	ND		440	11	**	11	"	ıı	11	
Phenanthrene	ND		440	11	"	n		ii		
Pyrene	ND		440	"	"		, H	"	lt .	
Surrogate: Nitrobenzene-d5		82 %	16-1	26		"	"	"	n	
Surrogate: 2-Fluorobiphenyl		79 %	28-1	34		"	"	<b>"</b>	"	
Surrogate: Terphenyl-d14		100 %	64-1			"	"	"	"	
F01009LS 4,2 (P209468-11) Soil	Sampled: 09/1	7/02 14:30	Received	1: 09/24/02	10:30					
Acenaphthene	ND		440	ug/kg dry	1	2090778	09/30/02	10/04/02	EPA 8270C	
Acenaphthylene	ND		440	"	**	11	- 11	11	"	
Anthracene										
	ND		440	**	**	It	"	**	n	
	ND ND		440 440	11	"	11	"	"	u H	
Benzo (a) anthracene	ND ND ND		440						H H	
Benzo (a) anthracene Benzo (b+k) fluoranthene (total)	ND			" =	**	"		"	n	
Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene	ND ND ND		440 440 440	11	#	11	, "	17 11	H	
Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene	ND ND ND ND		440 440	11 11	11 11	H H	, " "	# #	H H	
Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene	ND ND ND ND ND		440 440 440 440	11 11 17	11 11 11	11 11 11	11 11 11 11	" " "	n n n	
Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene	ND ND ND ND ND		440 440 440 440 440	11 11 11	# # # # # # # # # # # # # # # # # # #	11 11 11	n n u	11 11 11	n n n	
Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene	ND ND ND ND ND ND		440 440 440 440 440 440	11 11 11 11 11	11 11 11 11	11 11 11 11 11	11 11 11 11 11 11 11 11 11 11 11 11 11	11 11 11 11	11 11 11 11	
Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene Fluorene	ND ND ND ND ND ND ND		440 440 440 440 440 440 440	11 17 18 18	11 11 11 11 11 11 11 11 11	11 11 11 11 11	" " " " " " " " " " " " " " " " " " "	" " " " " " " " " " " " " " " " " " " "	D H H H	
Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene	ND		440 440 440 440 440 440 440 440	# # # # # # # # # # # # # # # # # # #	11 11 11 11 11 11 11 11 11 11 11 11 11	11 11 11 11 11 11 11 11 11 11 11 11 11	" " " " " " " " " " " " " " " " " " "	"""""""""""""""""""""""""""""""""""""""	D H H H	
Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene Naphthalene	ND		440 440 440 440 440 440 440 440 440	# # # # # # # # # # # # # # # # # # #	11 11 11 11 11	0 0 0 0 0	11 11 11 11 11 11 11 11 11 11 11 11 11	"" "" "" "" "" "" "" "" "" "" "" "" ""	11 11 11 11 11	
Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene	ND		440 440 440 440 440 440 440 440	" " " " " " " " " " " " " " " " " " "	11 11 11 11 11 11 11 11 11 11 11 11 11	11 11 11 11 11 11 11 11 11 11 11 11 11		"" "" "" "" "" "" "" "" "" "" "" "" ""	1) 11 11 11 11	
Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene Naphthalene Phenanthrene Pyrene	ND	69 %	440 440 440 440 440 440 440 440 440	# # # # # # # # # # # # # # # # # # #	11 11 11 11 11 11 11 11 11 11 11 11 11			" " " " " " " " " " " "	11 11 11 11 11	
Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene Naphthalene Phenanthrene	ND	69 % 72 %	440 440 440 440 440 440 440 440 440 440	"""""""""""""""""""""""""""""""""""""""	11 11 11 11 11 11 11 11 11 11 11 11 11	11 11 11 11 11 11 11 11 11 11 11 11 11		" " " " " " " " " " " "	# # # # # # # # # # # # # # # # # # #	

Sequoia Analytical - Petaluma







Project Number: [none]
Project Manager: Matt Neal

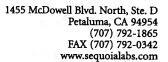
P209468
Reported:
10/14/02 18:10

## Semivolatile Organic Compounds by EPA Method 8270C Sequoia Analytical - Petaluma

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Note
F01009LS 4,1 (P209468-12) Soil	Sampled: 09/1	7/02 14:45	Received	: 09/24/02	10:30		al E	. 1	e ift.e.	
Acenaphthene	ND		430	ug/kg dry	1	2090778	09/30/02	10/04/02	EPA 8270C	. 3
Acenaphthylene	ND		430			**		u	"	
Anthracene	ND		430	"		11	11	11	**	
Benzo (a) anthracene	ND		430	"		"	**	11	n - 9	
Benzo (b+k) fluoranthene (total)	ND		430		11		H .	- 11		
Benzo (g,h,i) perylene	ND		430	11	"	11	11	11	11	
Benzo (a) pyrene	ND		430	"	"		11	19	"	
Chrysene	ND		430				× "	н	"	
Dibenz (a,h) anthracene	ND		430	11	n	" =	11	18	. "	
Fluoranthene	ND		430	н	11	n	"	11	11	
Fluorene	ND		430	n	11	n	**	**	"	
Indeno (1,2,3-cd) pyrene	ND		430	н	**	11	n	<b>u</b> 5	**	
Naphthalene	ND		430	11	10	11		**	**	
Phenanthrene	ND		430	11	•	#	11	11	**	
Pyrene	ND		430	11	•	11	H	er .	"	
Surrogate: Nitrobenzene-d5		56 %	16-12	26		"	"	"		
Surrogate: 2-Fluorobiphenyl		58 %	28-13	RA		"	"	"		
		20 70	20-1.	7						
Surrogate: Terphenyl-d14		100 %	64-1	•		"	"	"	"	
	Sampled: 09/1	100 %	64-1	19	10:30	"	"	"	"	
Surrogate: Terphenyl-d14	Sampled: 09/1	100 %	64-1	19	<b>10:30</b>	2090778	09/30/02	10/04/02	EPA 8270C	, t
Surrogate: Terphenyl-d14 F01009LS 5,3 (P209468-13) Soil		100 %	64-1	9 : 09/24/02		T	<b>6</b>			7 mo_
Surrogate: Terphenyl-d14 F01009LS 5,3 (P209468-13) Soil Acenaphthene	ND	100 %	64-11 Received	9: <b>09/24/02</b> ug/kg dry	1	2090778	09/30/02	10/04/02	EPA 8270C	
Surrogate: Terphenyl-d14 F01009LS 5,3 (P209468-13) Soil Acenaphthene Acenaphthylene	ND ND	100 %	64-11 Received 420 420	: <b>09/24/02</b> ug/kg dry	1 "	2090778	09/30/02	10/04/02	EPA 8270C	The second secon
Surrogate: Terphenyl-d14 F01009LS 5,3 (P209468-13) Soil Acenaphthene Acenaphthylene Anthracene	ND ND ND	100 %	64-11 Received 420 420 420	: 09/24/02 ug/kg dry	1	2090778	09/30/02	10/04/02	EPA 8270C	
Surrogate: Terphenyl-d14 F01009LS 5,3 (P209468-13) Soil Acenaphthene Acenaphthylene Anthracene Benzo (a) anthracene	ND ND ND ND	100 %	64-11 Received 420 420 420 420	: 09/24/02 ug/kg dry	1	2090778	09/30/02	10/04/02	EPA 8270C	The second of th
Surrogate: Terphenyl-d14 F01009LS 5,3 (P209468-13) Soil Acenaphthene Acenaphthylene Anthracene Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene	ND ND ND ND	100 %	420 420 420 420 420 420 420	19 : 09/24/02 ug/kg dry	1	2090778	09/30/02	10/04/02	EPA 8270C	
Surrogate: Terphenyl-d14 F01009LS 5,3 (P209468-13) Soil Acenaphthene Acenaphthylene Anthracene Benzo (a) anthracene Benzo (b+k) fluoranthene (total)	ND ND ND ND ND	100 %	420 420 420 420 420 420 420 420	19 : 09/24/02 ug/kg dry "	1	2090778	09/30/02	10/04/02	EPA 8270C	
Surrogate: Terphenyl-d14  F01009LS 5,3 (P209468-13) Soil  Acenaphthene Acenaphthylene Anthracene Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene	ND ND ND ND ND ND	100 %	420 420 420 420 420 420 420 420 420	19 : 09/24/02 ug/kg dry " "	1 " " " " " " " " " " " " " " " " " " "	2090778	09/30/02	10/04/02	EPA 8270C	
Surrogate: Terphenyl-d14  F01009LS 5,3 (P209468-13) Soil  Acenaphthene Acenaphthylene Anthracene Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene	ND	100 %	420 420 420 420 420 420 420 420 420 420	19 : 09/24/02 ug/kg dry " "	1 " " " " " " " " " " " " " " " " " " "	2090778	09/30/02	10/04/02	EPA 8270C	
Surrogate: Terphenyl-d14  F01009LS 5,3 (P209468-13) Soil  Acenaphthene Acenaphthylene Anthracene Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene	ND	100 %	420 420 420 420 420 420 420 420 420 420	: 09/24/02 ug/kg dry	1	2090778	09/30/02	10/04/02	EPA 8270C	
Surrogate: Terphenyl-d14  F01009LS 5,3 (P209468-13) Soil  Acenaphthene Acenaphthylene Anthracene Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene Fluorene	ND	100 %	420 420 420 420 420 420 420 420 420 420	: 09/24/02 ug/kg dry	1	2090778	09/30/02	10/04/02	EPA 8270C	
Surrogate: Terphenyl-d14  F01009LS 5,3 (P209468-13) Soil  Acenaphthene Acenaphthylene Anthracene Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene	ND N	100 %	420 420 420 420 420 420 420 420 420 420	: 09/24/02 ug/kg dry	1	2090778	09/30/02	10/04/02	EPA 8270C	
Surrogate: Terphenyl-d14  F01009LS 5,3 (P209468-13) Soil  Acenaphthene Acenaphthylene Anthracene Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene	ND N	100 %	420 420 420 420 420 420 420 420 420 420	19: 09/24/02 ug/kg dry " " " " " "	1	2090778	09/30/02	10/04/02	EPA 8270C	
Surrogate: Terphenyl-d14  F01009LS 5,3 (P209468-13) Soil  Acenaphthene Acenaphthylene Anthracene Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene Naphthalene	ND N	100 %	420 420 420 420 420 420 420 420 420 420	19: 09/24/02 ug/kg dry " " " " " " "	1 " " " " " " " " " " " " " " " " " " "	2090778	09/30/02	10/04/02	EPA 8270C	
Surrogate: Terphenyl-d14  F01009LS 5,3 (P209468-13) Soil  Acenaphthene Acenaphthylene Anthracene Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene Naphthalene Phenanthrene	ND N	100 %	420 420 420 420 420 420 420 420 420 420	: 09/24/02 ug/kg dry	1	2090778	09/30/02	10/04/02	EPA 8270C	
F01009LS 5,3 (P209468-13) Soil Acenaphthene Acenaphthylene Anthracene Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene Naphthalene Phenanthrene Pyrene	ND N	100 % 7/02 15:00	420 420 420 420 420 420 420 420 420 420	: 09/24/02 ug/kg dry " " " " " " " "	1	2090778	09/30/02	10/04/02	EPA 8270C	

Sequoia Analytical - Petaluma







Project: Saipan AES
Project Number: [none]
Project Manager: Matt Neal

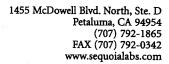
P209468 Reported: 10/14/02 18:10

## Semivolatile Organic Compounds by EPA Method 8270C Sequoia Analytical - Petaluma

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009LS 5,2 (P209468-14) Soil	Sampled: 09/1	7/02 15:10	Received	l: 09/24/02	10:30	AT 4. B ·	= 82	s d		5M
Acenaphthene	ND		410	ug/kg dry	1	2090778	09/30/02	10/04/02	EPA 8270C	-
Acenaphthylene	ND		410	"	**	H /	. "		**	
Anthracene	ND		410	"	n n	"	n	"	11	
Benzo (a) anthracene	ND		410	**	**	"			· ·	
Benzo (b+k) fluoranthene (total)	ND		410	H .		"	n			
Benzo (g,h,i) perylene	ND		410	W.		n	#	H .		
Benzo (a) pyrene	ND		410	n		**	**	n	"	
Chrysene	ND		410	rr 🔠		"	**	H	••	
Dibenz (a,h) anthracene	ND		410	н ,	"	"	, 11	"		
Fluoranthene	ND		410	**	"	"	. "	"	"	
Fluorene	ND		410	W	**	"	"	"	11	
Indeno (1,2,3-cd) pyrene	ND		410	"	#1	"	**		= 11	
Naphthalene	ND		410	"	Ħ	**	. "	"	11	
Phenanthrene	ND		410	**	Ħ	н	**	II .	н	
Pyrene	ND		410	" ,	tr	**	11	"	"	
Surrogate: Nitrobenzene-d5		78 %	16-1.	26		"	"	"	" .	
Surrogate: 2-Fluorobiphenyl		<i>79 %</i>	28-1.	34		. "	"	,,	"	
Surrogate: Terphenyl-d14		101 %	64-1	19		"	*	"	"	
F01009LS 5,1 (P209468-15) Soil	Sampled: 09/1	7/02 15:20	Received	l: 09/24/02	10:30		iz u	ų.		
Acenaphthene	ND		510	ug/kg dry	1	2090778	09/30/02	10/04/02	EPA 8270C	
Acenaphthylene	ND		510	н ,	**	"		"	#	
Anthracene	ND		510	H	**	11 ,	**	"	Ħ	
Benzo (a) anthracene	ND		510	Ħ	"	**		"		
Benzo (b+k) fluoranthene (total)	ND		510	P	"	11		"	"	
Benzo (g,h,i) perylene	ND		510	**	11	" .	II .	1f	, , <b>n</b>	
Benzo (a) pyrene	ND		510	n	11	**	If	11	"	
Chrysene	ND		510	n	11	"	11	11	11	
Dibenz (a,h) anthracene	ND		510		**	**	. 11	**	. "	
Fluoranthene	ND		510	0 '	11	n	17	11	11	
Fluorene	ND		510	u I	11	**	17	11	"	
Indeno (1,2,3-cd) pyrene	ND		510	11	н	"	17	18	"	
Naphthalene	ND		510	11	*	•	"	11	**	
Phenanthrene	ND		510	н	"		"	**	"	
Dirana	ND		510	H 1	n	11	II .	11		
Pyrene										
Surrogate: Nitrobenzene-d5		65 %	16-1.	26		"	"	"	"	
		65 % 64 %	16-1. 28-1.	-		"	"	"	"	

Sequoia Analytical - Petaluma







2850 Paa Street, Suite 212 Honolulu HI, 96819 Project: Saipan AES

Project Number: [none]
Project Manager: Matt Neal

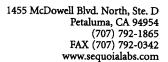
P209468 Reported: 10/14/02 18:10

## Semivolatile Organic Compounds by EPA Method 8270C Sequoia Analytical - Petaluma

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009LS 6,3 (P209468-16) Soil	Sampled: 09/1	17/02 15:40	Received	: 09/24/02	10:30			А .	* L	
Acenaphthene	ND		450	ug/kg dry	1	2090778	09/30/02	10/04/02	EPA 8270C	¥
Acenaphthylene	ND		450	n	"	n /	l <del>1</del>	11	"	
Anthracene	ND		450	**	"	"	11	"	"	
Benzo (a) anthracene	ND		450	ч	n	**	11	u u	. н	
Benzo (b+k) fluoranthene (total)	ND		450		**	и	"	. 10	u	
Benzo (g,h,i) perylene	ND		450	11	**	11	**	II	11	
Benzo (a) pyrene	ND		450		**	"	н	**	u	
Chrysene	ND		450	11	**	**	"	u	11	
Dibenz (a,h) anthracene	ND		450	10	"	"	p = 0	11	tt	
Fluoranthene	ND		450	11	"	"	"	u	11	
Fluorene	ND		450	11	11	**	"	H	н	
Indeno (1,2,3-cd) pyrene	ND		450	11	11		**	"	11	
Naphthalene	ND		450	11	11	"	"		11	
Phenanthrene	ND		450	**	"	**	"	"	11	
Pyrene	ND		450	**	11	"	"	"	11	
Surrogate: Nitrobenzene-d5		73 %	16-12	26		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		74 %	28-13	34		n	"	"	"	
Surrogate: Terphenyl-d14		100 %	64-11	19		"	"	"		
F01009LS 6,2 (P209468-17) Soil	Sampled: 09/1	7/02 15:50	Received	: 09/24/02	10:30					
Acenaphthene	ND -		530	ug/kg dry	1	2090778	09/30/02	10/04/02	EPA 8270C	
Acenaphthylene	ND		530	"					19	
4 .4			220		"	11	. "	"		
Anthracene	ND		530		"	11		"	" "	
	ND ND									
Benzo (a) anthracene			530	"	"	11	"		H	
Benzo (a) anthracene Benzo (b+k) fluoranthene (total)	ND		530 530	H H,	"	11	H . H	11	H H	
Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene	ND ND		530 530 530	0 0, 0	"	11 11	11 11	11 11	H H	
Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene	ND ND ND ND		530 530 530 530	и и, иј.	11 11 11	11 11 11	11 11 11	" " " " " " " " " " " " " " " " " " " "	n n n	
Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene	ND ND ND ND ND		530 530 530 530 530 530	и и, иц.	11 11 11	11 11 11	11 11 11 11 11 11 11 11 11 11 11 11 11	" " " "	n n n	
Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene	ND ND ND ND		530 530 530 530 530	# # # # # # # # # # # # # # # # # # #	11 11 11 11	11 11 11 11	11 11 11 11 11 11 11 11 11 11 11 11 11	""	n n n n	
Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene	ND ND ND ND ND ND		530 530 530 530 530 530 530	0 0 0 0 0 0	" " " " " "	11 11 11 11	11 11 11 11 11 11 11 11 11 11 11 11 11	""	0 0 0 0 0	
Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene Fluorene	ND ND ND ND ND ND		530 530 530 530 530 530 530 530	n	11 11 11 11 11 11 11	11 11 11 11 11 11	n n n n	""	0 0 0 0 0	
Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene	ND ND ND ND ND ND ND		530 530 530 530 530 530 530 530 530	H H H H H H H H H H H H H H H H H H H	" " " " " "	11 11 11 11 11 11	11 11 11 11 11 11 11 11 11 11 11 11 11	"""""""""""""""""""""""""""""""""""""""	12 11 11 10 10 10 11	
Anthracene Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene Naphthalene Phenanthrene	ND ND ND ND ND ND ND ND		530 530 530 530 530 530 530 530 530 530	H H H H H H H H H H H H H H H H H H H	11 11 11 11 11 11 11 11 11 11	11 11 11 11 11 11 11	0 0 0 0 0	""	0 0 0 0 0 0	
Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene Naphthalene	ND		530 530 530 530 530 530 530 530 530 530	H H H H H H H H H H H H H H H H H H H	11 11 11 11 11 11 11 11 11 11	11 11 12 12 13 14 14 15 16 17 17 18 18 18 18 18 18 18 18 18 18 18 18 18	0 0 0 0 0 0 0 0	"""""""""""""""""""""""""""""""""""""""	0 0 0 0 0 0 0	
Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene Naphthalene Phenanthrene	ND N	69 %	530 530 530 530 530 530 530 530 530 530	11 11 11 11 11 11 11 11 11 11 11 11 11	" " " " " " " " " " " "	11 11 11 11 11 11 11 11 11 11 11 11 11	10 10 10 10 10 10 10 10 10 10 10 10 10 1	" " " " " " " " " " "		
Benzo (a) anthracene Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene Benzo (a) pyrene Chrysene Dibenz (a,h) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene Naphthalene Phenanthrene Pyrene	ND N	69 % 63 %	530 530 530 530 530 530 530 530 530 530	""	" " " " " " " " " " " "	11 11 11 11 11 11 11 11	11 11 11 11 11 11 11 11 11 11 11 11 11	"" "" "" "" "" "" "" "" "" "" "" "" ""	12 17 18 19 19 19 19 19 19 19 19 19 19 19 19 19	

Sequoia Analytical - Petaluma







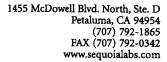
Project: Saipan AES
Project Number: [none]
Project Manager: Matt Neal

P209468
Reported:
10/14/02 18:10

#### Semivolatile Organic Compounds by EPA Method 8270C Sequoia Analytical - Petaluma

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009LS 6,1 (P209468-18) Soil	Sampled: 09/1	7/02 16:05	Received	: 09/24/02	10:30					
Acenaphthene	ND		520	ug/kg dry	1	2090778	09/30/02	10/04/02	EPA 8270C	
Acenaphthylene	ND		520		If	**	tt	"		
Anthracene	ND		520		11	**	11		**	
Benzo (a) anthracene	ND		520		**	**	11	11	n	
Benzo (b+k) fluoranthene (total)	ND		520	**	"	"	"	**	t <del>r</del>	
Benzo (g,h,i) perylene	ND		520	11	4	"	**	**	**	
Benzo (a) pyrene	ND		520	17	"		"	It	u	
Chrysene	ND		520	**	"	"	"	11		
Dibenz (a,h) anthracene	ND		520	11	**	"	"	II	"	
Fluoranthene	ND		520	11	11	"	11	н	"	
Fluorene	ND		520		**		н _	11	**	
Indeno (1,2,3-cd) pyrene	ND		520	"	**	**	H	"	**	
Naphthalene	ND		520	H	"	**	u	11	11	
Phenanthrene	ND		520	"	**	**	If	"	II .	
Pyrene	ND		520	H	11	**	n	"	H .	
Surrogate: Nitrobenzene-d5		71 %	16-12	6		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		67 %	28-13	4		"	"	"	"	
Surrogate: Terphenyl-d14		93 %	64-11	9		"	"	"	"	

Sequoia Analytical - Petaluma



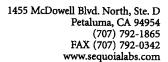


Project Number: [none]
Project Manager: Matt Neal

P209468
Reported:
10/14/02 18:10

#### Conventional Chemistry Parameters by APHA/EPA Methods Sequoia Analytical - Petaluma

Analyte	Result MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009LS 1,3 (P209468-01) Soil	Sampled: 09/17/02 12:20	Received	: 09/24/0	02 10:30			- 0		
% Solids	74	0.10	%	1	2090726	09/26/02	09/26/02	SM 2540G	HT-04
F01009LS 1,2 (P209468-02) Soil	Sampled: 09/17/02 12:39	Received	: 09/24/0	02 10:30					
% Solids	65	0.10	%	1	2090726	09/26/02	09/26/02	SM 2540G	HT-04
F01009LS 1,1 (P209468-03) Soil	Sampled: 09/17/02 12:45	Received	: 09/24/0	02 10:30					
% Solids	78	0.10	%	1	2090726	09/26/02	09/26/02	SM 2540G	HT-04
F01009LS 2,3 (P209468-04) Soil	Sampled: 09/17/02 13:00	Received	: 09/24/0	02 10:30					
% Solids	76	0.10	%	1	2090726	09/26/02	09/26/02	SM 2540G	HT-04
F01009LS 2,2 (P209468-05) Soil	Sampled: 09/17/02 13:15	Received	: 09/24/0	02 10:30					
% Solids	76	0.10	%	1	2090726	09/26/02	09/26/02	SM 2540G	HT-04
F01009LS 2,1 (P209468-06) Soil	Sampled: 09/17/02 13:25	Received	: 09/24/0	02 10:30					
% Solids	73	0.10	%	1	2090726	09/26/02	09/26/02	SM 2540G	HT-04
F01009LS 3,3 (P209468-07) Soil	Sampled: 09/17/02 13:40	Received	: 09/24/0	02 10:30					
% Solids	74	0.10	%	1	2090726	09/26/02	09/26/02	SM 2540G	HT-04
F01009LS 3,2 (P209468-08) Soil	Sampled: 09/17/02 13:50	Received	: 09/24/0	02 10:30					
% Solids	62	0.10	%	1	2090726	09/26/02	09/26/02	SM 2540G	HT-04
F01009LS 3,1 (P209468-09) Soil	Sampled: 09/17/02 14:00	Received	: 09/24/0	02 10:30					
% Solids	76	0.10	%	1	2090726	09/26/02	09/26/02	SM 2540G	HT-04



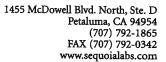


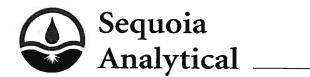
Project Number: [none]
Project Manager: Matt Neal

P209468
Reported:
10/14/02 18:10

#### Conventional Chemistry Parameters by APHA/EPA Methods Sequoia Analytical - Petaluma

6. 6.									
Analyte	Result MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F01009LS 4,3 (P209468-10) Soil	Sampled: 09/17/02 14:15	Received	: 09/24/	02 10:30					
% Solids	75	0.10	%	1	2090726	09/26/02	09/26/02	SM 2540G	HT-04
F01009LS 4,2 (P209468-11) Soil	Sampled: 09/17/02 14:30	Received	: 09/24/	02 10:30					
% Solids	75	0.10	%	1	2090726	09/26/02	09/26/02	SM 2540G	HT-04
F01009LS 4,1 (P209468-12) Soil	Sampled: 09/17/02 14:45	Received	: 09/24/	02 10:30					
% Solids	76	0.10	%	□ 1 =	2090726	09/26/02	09/26/02	SM 2540G	HT-04
F01009LS 5,3 (P209468-13) Soil	Sampled: 09/17/02 15:00	Received	: 09/24/	02 10:30					
% Solids	79	0.10	%	1	2090726	09/26/02	09/26/02	SM 2540G	HT-04
F01009LS 5,2 (P209468-14) Soil	Sampled: 09/17/02 15:10	Received	: 09/24/	02 10:30					
% Solids	80	0.10	%	1	2090726	09/26/02	09/26/02	SM 2540G	HT-04
F01009LS 5,1 (P209468-15) Soil	Sampled: 09/17/02 15:20	Received	: 09/24/	02 10:30					
% Solids	65	0.10	%	1	2090726	09/26/02	09/26/02	SM 2540G	HT-04
F01009LS 6,3 (P209468-16) Soil	Sampled: 09/17/02 15:40	Received	: 09/24/	02 10:30					
% Solids	73	0.10	%	1	2090726	09/26/02	09/26/02	SM 2540G	HT-04
F01009LS 6,2 (P209468-17) Soil	Sampled: 09/17/02 15:50	Received	: 09/24/	02 10:30					
% Solids	63	0.10	%	1	2090726	09/26/02	09/26/02	SM 2540G	HT-04
F01009LS 6,1 (P209468-18) Soil	Sampled: 09/17/02 16:05	Received	: 09/24/	02 10:30					
% Solids	64	0.10	%	1	2090726	09/26/02	09/26/02	SM 2540G	HT-04





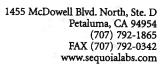
2850 Paa Street, Suite 212 Honolulu HI, 96819 Project: Saipan AES

Project Number: [none]
Project Manager: Matt Neal

P209468
Reported:
10/14/02 18:10

## Total Metals by EPA 6000/7000 Series Methods - Quality Control Sequoia Analytical - Petaluma

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2090710 - EPA 7471A					===	30					
Blank (2090710-BLK1)					Prepared:	10/06/02	Analyzed:	10/09/02			
Mercury	0.00537	0.00059	0.020 n	ng/kg wet	22						
Laboratory Control Sample (20907	710-BS1)			]	Prepared:	10/06/02	Analyzed:	10/09/02			
Mercury	0.114	0.00055	0.018 n	ng/kg wet			93	80-120			
Matrix Spike (2090710-MS1)		Source	: P209468-	<b>01</b>	Prepared:	10/06/02	Analyzed:	10/09/02			
Mercury	0.158	0.00074		ng/kg dry	0.165	0.018	85	80-120			
Matrix Spike Dup (2090710-MSD1	)	Source	: P209468-		Prenared.	10/06/02	Analyzed:				
Mercury	0.144	0.00065		ng/kg dry	0.144	0.018	88	80-120	9	20	
Potob 2000740 ED 4 2050D				J J,				30 .20	-	-0	
Batch 2090740 - EPA 3050B											
Blank (2090740-BLK1)	· · · · · · · · · · · · · · · · · · ·			]	Prepared:	10/03/02	Analyzed:	10/09/02			
Arsenic	ND	3.5	10 n	ng/kg wet							100
Cadmium	ND	0.28	1.0	11							
Chromium	ND	0.16	1.0	u							
Copper	ND	0.69	1.0								
Lead	ND	1.2	7.5	"							
Nickel	ND	0.77	3.0	11							
Selenium	ND	4.7	10	**							
Tin	15.6	6.2	35	**							
Zinc	0.891	0.40	2.0	n							
Laboratory Control Sample (20907	40-BS1)				Prepared:	10/03/02	Analyzed:	10/09/02			
Arsenic	46.6	3.5	10 m	g/kg wet	50.0		93	80-120		***********	
Cadmium	4.48	0.28	1.0	"	5.00		90	80-120			
Chromium	46.2	0.16	1.0	Ħ	50.0		92	80-120			
Copper	46.4	0.69	1.0	**	50.0		93	80-120			
Lead	45.6	1.2	7.5		50.0		91	80-120			
Nickel	45.8	0.77	3.0		50.0		92	80-120			
Selenium	49.5	4.7	10	"	50.0		99	80-120			
Tin	225	6.2	35	**	250		90	80-120			
Zinc	46.5	0.40	2.0	**	250		20	00-120			





2850 Paa Street, Suite 212 Honolulu HI, 96819 Project: Saipan AES

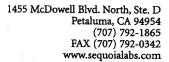
Project Number: [none]
Project Manager: Matt Neal

P209468 Reported: 10/14/02 18:10

## Total Metals by EPA 6000/7000 Series Methods - Quality Control Sequoia Analytical - Petaluma

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2090740 - EPA 3050B							-	p ÷	er <sub>z</sub> v	<sub>2</sub> = 11 <sup>24</sup>	-
Matrix Spike (2090740-MS1)		Source	P209468-	01	Prepared:	10/03/02	Analyzed:	10/09/02	80 1		71.0
Arsenic	54.1	4.2	12 n	ng/kg dry	59.6	ND	91	80-120	<u>-</u>		
Cadmium	5.00	0.33	1.2	11	5.96	ND	84	80-120			
Chromium	51.1	0.19	1.2	11	59.6	5.5	77	80-120			QM-RX
Copper	52.2	0.82	1.2	11	59.6	ND	88	80-120			·
Lead	43.4	1.5	8.9		59.6	ND	73	80-120			QM-RX
Nickel	43.7	0.92	3.6	"	59.6	ND	73	80-120			QM-RX
Selenium	51.1	5.6	12	**	59.6	ND	86	80-120			
Tin	282	7.4	42	"	298	29	85	80-120			
Zinc	49.6	0.48	2.4	11	59.6	2.1	80	80-120			QM-RX
Matrix Spike (2090740-MS2)		Source	P209468-	01	Prepared:	10/03/02	Analyzed:	10/09/02			
Arsenic	62.1	4.6	13 n	ng/kg dry	65.3	ND	95	80-120			R.A
Chromium	55.5	0.21	1.3	"	65.3	5.5	77	80-120			R.A
Lead	48.2	1.6	9.8	11	65.3	ND	74	80-120			R.A
Nickel	50.7	1.0	3.9	**	65.3	ND	78	80-120			R.A
Tin	295	8.1	46	**	327	29	81	80-120			R.A
Zinc	55.9	0.52	2.6	"	65.3	2.1	82	80-120			R.A
Matrix Spike Dup (2090740-MSD1)		Source	P209468-	01	Prepared:	10/03/02	Analyzed:	10/09/02			
Arsenic	71.0	4.7	13 n	ng/kg dry	66.6	ND	107	80-120	27	20	QM-RX
Cadmium	5.80	0.37	1.3	**	6.66	ND	87	80-120	15	20	•
Chromium	57.6	0.21	1.3	#	66.6	5.5	78	80-120	12	20	QM-RX
Copper	59.4	0.92	1.3	н	66.6	ND	89	80-120	13	20	-
Lead	51.3	1.6	10	11	66.6	ND	77	80-120	17	20	QM-RX
Nickel	52.5	1.0	4.0	n	66.6	ND	79	80-120	18	20	QM-RX
Selenium	62.7	6.3	13	**	66.6	ND	94	80-120	20	20	•
Tin	287	8.2	47	11	333	29	77	80-120	2	20	QM-RX
Zinc	56.5	0.53	2.7	**	66.6	2.1	82	80-120	13	20	•







Environet, Inc. 2850 Paa Street, Suite 212

Honolulu HI, 96819

Project: Saipan AES

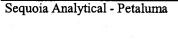
Project Number: [none]

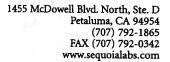
P209468 Reported:

Project Manager: Matt Neal 10/14/02 18:10

## Total Metals by EPA 6000/7000 Series Methods - Quality Control Sequoia Analytical - Petaluma

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2090740 - EPA 30	)50B	_								, The	1
Matrix Spike Dup (209074	0-MSD2)	Source	: P209468-0	01	Prepared:	10/03/02	Analyzed:	10/09/02	S M		er ir la
Arsenic	63.9	4.6	13 m	ng/kg dry	65.3	ND	98	80-120	3	20	RA
Chromium	57.7	0.21	1.3	••	65.3	5.5	80	80-120	4	20	RA
Lead	49.6	1.6	9.8	**	65.3	ND	76	80-120	3	20	RA
Nickel	51.8	1.0	3.9	tt.	65.3	ND	79	80-120	2	20	RA
Tin	316	8.1	46	H	327	29	88	80-120	7	20	RA
Zinc	56.7	0.52	2.6	11	65.3	2.1	84	80-120	1	20	RA







Environet, Inc. 2850 Paa Street, Suite 212

Honolulu HI, 96819

Project: Saipan AES
Project Number: [none]
Project Manager: Matt Neal

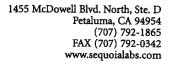
P209468
Reported:
10/14/02 18:10

## Polychlorinated Biphenyls by EPA Method 8082 - Quality Control Sequoia Analytical - Petaluma

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2090779 - EPA 3550A									1		
Blank (2090779-BLK1)		<u></u>			Prepared	: 09/30/02	Analyzed	: 10/02/02	G and	i sa	C-01, C-06
PCB-1016	ND		33 ι	ıg/kg wet							
PCB-1221	ND		33	11							
PCB-1232	ND		33	**							
PCB-1242	ND		33	**							
PCB-1248	ND		33	**							
PCB-1254	ND		33								
PCB-1260	ND		33								
Surrogate: Decachlorobiphenyl	52.3			"	66.7		78	46-115		-	
Laboratory Control Sample (20907	79-BS1)		31, 1		Prepared	09/30/02	Analyzed	: 10/02/02	,	1	C-01, C-06
PCB-1016	209		33 ι	g/kg wet	333		63	57-115			
PCB-1260	242		33	"	333		73	71-120			
Surrogate: Decachlorobiphenyl	49.5			"	66.7		74	46-115	×		<del></del>
Matrix Spike (2090779-MS1)		Source:	P209468-	02	Prepared	09/30/02	Analyzed	: 10/02/02			C-01, C-06
PCB-1016	271		51 u	g/kg dry	515	ND	53	23-142			
PCB-1260	270		51	**	515	ND	52	28-148			
Surrogate: Decachlorobiphenyl	48.0			"	103		47	46-115			
Matrix Spike Dup (2090779-MSD1)	)	Source:	P209468-	02	Prepared:	09/30/02	Analyzed	: 10/02/02			C-01, C-06
PCB-1016	331		51 u	g/kg dry	515	ND	64	23-142	20	35	, , , , , , , , , , , , , , , , , , , ,
PCB-1260	336		51	"	515	ND	65	28-148	22	35	
Surrogate: Decachlorobiphenyl	59.2			"	103		57	46-115			
Batch 2100154 - EPA 3550A											
Blank (2100154-BLK1)					Prepared:	10/04/02	Analyzed	: 10/07/02			C-01, C-06
PCB-1016	ND		33 u	g/kg wet			-		-		
PCB-1221	ND		33	"							
PCB-1232	ND		33	"							
PCB-1242	ND		33	"							
PCB-1248	ND		33	"							
PCB-1254	ND		33	"							
PCB-1260	ND		33	11							
Surrogate: Decachlorobiphenyl	59.8			"	66.7		90	46-115			

Sequoia Analytical - Petaluma







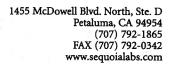
2850 Paa Street, Suite 212 Honolulu HI, 96819 Project: Saipan AES

Project Number: [none]
Project Manager: Matt Neal

P209468
Reported:
10/14/02 18:10

## Polychlorinated Biphenyls by EPA Method 8082 - Quality Control Sequoia Analytical - Petaluma

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD -	RPD Limit	Notes
Batch 2100154 - EPA 3550A											line
Laboratory Control Sample (2100	154-BS2)				Prepared:	10/04/02	Analyzed:	10/07/02		.10	C-01, C-06
PCB-1016	220		33 ι	ig/kg wet	333		66	57-115			
PCB-1260	282		33	"	333		85	71-120			
Surrogate: Decachlorobiphenyl	56.7			"	66.7	23.0	85	46-115		_ 1 64 6	
Matrix Spike (2100154-MS2)		Source	: P209468-	02RE	Prepared:	10/04/02	Analyzed:	10/07/02			C-01, C-06
PCB-1016	332		51 ı	ıg/kg dry	515	ND	64	23-142			
PCB-1260	399		51	**	515	ND	77	28-148			
Surrogate: Decachlorobiphenyl	81.0			"	103		79	46-115	II Ii		
Matrix Spike Dup (2100154-MSD	2)	Source	: P209468-	02RE	Prepared:	10/04/02	Analyzed:	10/07/02			C-01, C-06
PCB-1016	323		51 u	ıg/kg dry	515	ND	63	23-142	3	35	
PCB-1260	391		51	"	515	ND	76	28-148	2	35	
Surrogate: Decachlorobiphenyl	78.4			"	103		76	46-115			





2850 Paa Street, Suite 212 Honolulu HI, 96819 Project: Saipan AES

Project Number: [none]
Project Manager: Matt Neal

P209468 Reported:

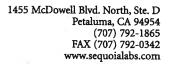
10/14/02 18:10

# Semivolatile Organic Compounds by EPA Method 8270C - Quality Control Sequoia Analytical - Petaluma

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Mada
rularyte	Result	WIDE	Limit	Ullits	Level	Result	%REC	Limits	KPD	Limit	Notes
Batch 2090778 - EPA 3550	OA Sonication				<u>.</u>			e 10		1111	. 0
Blank (2090778-BLK1)	<u> </u>				Prepared	09/30/02	Analyzed	l: 10/02/02			
Acenaphthene	ND		330 ι	ig/kg wet							
Acenaphthylene	ND		330	**							
Anthracene	ND		330	**							
Benzo (a) anthracene	ND		330	**							
Benzo (b+k) fluoranthene (total)	ND		330	**							
Benzo (g,h,i) perylene	ND		330	"							
Benzo (a) pyrene	ND		330								
Chrysene	ND		330	_1 "							
Dibenz (a,h) anthracene	ND		330	"							
Fluoranthene	ND		330	Ħ							
Fluorene	ND		330	H							
Indeno (1,2,3-cd) pyrene	ND		330	**							
Naphthalene	ND		330	**							
Phenanthrene	ND		330								
Pyrene	ND		330	"							
Surrogate: Nitrobenzene-d5	2580			"	3330		77	16-126			
Surrogate: 2-Fluorobiphenyl	2600			"	3330		<i>78</i>	28-134			-
Surrogate: Terphenyl-d14	3650			"	3330		110	64-119			
Laboratory Control Sample (	2090778-BS1)				Prepared:	09/30/02	Analyzed	l: 10/02/02			
Acenaphthene	2870		330 ι	ıg/kg wet			86	58-120	4		
Pyrene	3280		330	11	3330		98	52-127			
Surrogate: Nitrobenzene-d5	2740			"	3330	•	82	16-126			
Surrogate: 2-Fluorobiphenyl	2880			"	3330		86	28-134			
Surrogate: Terphenyl-d14	3760			"	3330		113	64-119			
Matrix Spike (2090778-MS1)	)	Source	: P209468-	01	Prepared:	09/30/02	Analyzed	l: 10/03/02			
Acenaphthene	3420	··	450 ı	ıg/kg dry	4530	ND	75	21-123	1 1 2 3 4 1		
Pyrene	4780		450	11	4530	ND	106	5-137			
Surrogate: Nitrobenzene-d5	3450			"	4530		76	16-126			
Surrogate: 2-Fluorobiphenyl	3500			"	4530		77	28-134			
Surrogate: Terphenyl-d14	5690			"	4530		126	64-119			S-E

Sequoia Analytical - Petaluma







Environet, Inc.

2850 Paa Street, Suite 212 Honolulu HI, 96819 Project: Saipan AES

Project Number: [none]
Project Manager: Matt Neal

P209468
Reported:
10/14/02 18:10

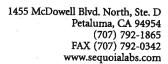
## Semivolatile Organic Compounds by EPA Method 8270C - Quality Control Sequoia Analytical - Petaluma

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2090778 - EPA 3550A So	onication							garner)			
Matrix Spike (2090778-MS2)		Source	: P209468-0	1	Prepared:	09/30/02	Analyzed	i: 10/03/02			14
Acenaphthene	3650		450 ug	kg dry	4530	ND	81	21-123			
Pyrene	4350		450	**	4530	ND	96	5-137			
Surrogate: Nitrobenzene-d5	3520			"	4530		78	16-126		· · · · ·	
Surrogate: 2-Fluorobiphenyl	3730			"	4530		82	28-134			
Surrogate: Terphenyl-d14	5160			"	4530		114	64-119			
Matrix Spike Dup (2090778-MSD)	1)	Source	: P209468-0	1	Prepared:	09/30/02	Analyzeo	d: 10/03/02			
Acenaphthene	3480		450 us	/kg dry	4530	ND	77	21-123	2	31	
Pyrene	4190		450	!!	4530	ND	92	5-137	13	44	
Surrogate: Nitrobenzene-d5	3480		<u> </u>	"	4530		77	16-126			
Surrogate: 2-Fluorobiphenyl	3580			"	4530		79	28-134			
Surrogate: Terphenyl-d14	5030			"	4530		111	64-119			
Matrix Spike Dup (2090778-MSD2	2)	Source	: P209468-0	1	Prepared:	09/30/02	Analyzeo	i: 10/03/02			
Acenaphthene	3650	Dourte		/kg dry	4530	ND	81	21-123	0	31	
Pyrene	4210		450	"	4530	ND	93	5-137	3	44	
Surrogate: Nitrobenzene-d5	3570			"	4530		79	16-126			
Surrogate: 2-Fluorobiphenyl	3800			"	4530		84	28-134			
Surrogate: Terphenyl-d14	5000			"	4530		110	64-119			
Batch 2100198 - EPA 3550A So	mination								12.51		
	mication			9	D 1	10/07/02	A	1 10/00/02	·		
Blank (2100198-BLK1)	ND		220			10/0 //02	Analyzed	1: 10/09/02			
Acenaphthene	ND			kg wet							
Acenaphthylene Anthracene	ND ND		330	"							
	- ND ND		330	"							
Benzo (a) anthracene	ND ND		330 330								
Benzo (b+k) fluoranthene (total) Benzo (g,h,i) perylene	עא ND		330								
Benzo (g,n,i) peryiene Benzo (a) pyrene	ND ND		330								
Chrysene	ND		330								
Om Judito			330								
Dihenz (a h) anthracene	NП					9					
Dibenz (a,h) anthracene	ND ND										
Fluoranthene	ND		330	"							
Fluoranthene Fluorene	ND ND		330 330								
Fluoranthene	ND		330	"							

Sequoia Analytical - Petaluma

The results in this report apply to the samples analyzed in accordance with the chain of custody document. Unless otherwise stated, results are reported on a wet weight basis. This analytical report must be reproduced in its entirety.







Environet, Inc.

2850 Paa Street, Suite 212 Honolulu HI, 96819 Project: Saipan AES

Project Number: [none]

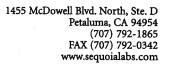
Project Manager: Matt Neal

P209468 Reported: 10/14/02 18:10

## Semivolatile Organic Compounds by EPA Method 8270C - Quality Control Sequoia Analytical - Petaluma

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2100198 - EPA 3550A So				-		rosar	70ICEC	Zimita			140165
Blank (2100198-BLK1)		NI.		lu 1	Prenared:	10/07/02	Analyzed	I: 10/09/02			
Pyrene	ND		330 u	g/kg wet	roparea.	10/0//02	Maryzeo	1. 10/05/02			
Surrogate: Nitrobenzene-d5	2360			"	3330		71	16-126			
Surrogate: 2-Fluorobiphenyl	2440			"	3330		73	28-134			
Surrogate: Terphenyl-d14	3340			"	3330		100	64-119			
Laboratory Control Sample (21001	98-BS1)			]	Prepared:	10/07/02	Analyzed	l: 10/09/02			
Acenaphthene	2830		330 u	g/kg wet	3330		85	58-120			
Pyrene	3180		330	11	3330		95	52-127			
Surrogate: Nitrobenzene-d5	2600			"	3330		78	16-126			
Surrogate: 2-Fluorobiphenyl	2780			"	3330		83	28-134			
Surrogate: Terphenyl-d14	3610			"	3330		108	64-119			
Matrix Spike (2100198-MS1)		Source:	P210001-	<b>73</b>	Prepared:	10/07/02	Analyzed	i: 10/10/02			
Acenaphthene	2650		330 u	g/kg wet	3330	ND	80	21-123			
Pyrene	3250		330	"	3330	52	96	5-137			
Surrogate: Nitrobenzene-d5	2530			"	3330		76	16-126			-
Surrogate: 2-Fluorobiphenyl	2640			"	3330		79	28-134			
Surrogate: Terphenyl-d14	3690			"	3330		111	64-119			
Matrix Spike Dup (2100198-MSD1)	)	Source:	P210001-	73 1	Prepared:	10/07/02	Analyzed	: 10/10/02			
Acenaphthene	2640		330 u	g/kg wet	3330	ND	79	21-123	0.4	31	
Рутепе	3190		330	"	3330	52	94	5-137	2	44	
Surrogate: Nitrobenzene-d5	2460			п	3330		74	16-126			
Surrogate: 2-Fluorobiphenyl	2690			"	3330		81	28-134			
Surrogate: Terphenyl-d14	3640			n	3330		109	64-119			







Environet, Inc.

2850 Paa Street, Suite 212 Honolulu HI, 96819 Project: Saipan AES

Project Number: [none]
Project Manager: Matt Neal

P209468 Reported:

10/14/02 18:10

## Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control Sequoia Analytical - Petaluma

			Reporting		Spike	Source		%REC		RPD	
Analyte	Result	MDL	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

Batch 2090726 - General Preparation

Duplicate (2090726-DUP1)	5.0	Source: P209468-01		Prepared & Analyzed: 09/26/02	18		
% Solids	74.2	0.10	%	74	0.3	35	







Environet, Inc.

2850 Paa Street, Suite 212

Honolulu HI, 96819

Project Number: [none]

Project Manager: Matt Neal

P209468
Reported:
10/14/02 18:10

#### **Notes and Definitions**

C-01 To reduce matrix interference, the sample extract has undergone sulfuric acid clean-up, method 3665, which is specific to hydrocarbon contamination.

C-06 To reduce matrix interference, the sample extract has undergone TBA (sulfur) clean-up, method 3660B.

HT-03 This sample was extracted beyond the EPA recommended holding time. The results may still be useful for their intended purpose.

HT-04 This sample was analyzed beyond the EPA recommended holding time. The results may still be useful for their intended purpose.

J Estimated value.

QM-RX The spike recovery was outside control limits for the MS and/or MSD due to matrix interference. Re-extraction/re-analysis performed to confirm original MS/MSD results.

RA The result is from re-extraction and re-analysis to confirm original MS/MSD result.

S-BN Base/Neutral surrogate recovery outside control limits. The data was accepted based on valid recovery of remaining two

base/neutral surrogates.

S-LIM The surrogate recovery was outside control limits. The result may still be useful for its intended purpose.

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference



1455 McDowell Blvd, Suite D. • **Petaluma, CA 94954** • (707) 792-1865 • FAX (707) 792-0342 819 Striker Ave., Suite 8 • **Sacramento, CA 95834** • (916) 921-9600 • FAX (916) 921-0100 1551 Industrial Road • **San Carlos, CA 94070** • (650) 232-9600 • FAX (650) 232-9612 404 N. Wiget Lane • Walnut Creek, CA 94598 • (925) 988-9600 • FAX (925) 988-9673 885 Jarvis Drive • Morgan Hill, CA 95037 • (408) 776-9600 • FAX (408) 782-6308 ه م مراز ه

Company Name:	Enviored .	14				Project:	12 12 12 12 12 12 12 12 12 12 12 12 12 1	1 AB	L		
, ,	ľ		キュル			Billing A	Billing Address (if different)	i I			l
City: Ho. E. C. L.		ate: 🛕	1	Zip Code: 96	96819						
ا	837-222	Fax #:	30	22 28		P.O. #:					.
Mark		ĕ	1	_	. 1000	C, e QC Data:		☐ Level II (standard)	) 🗀 Level III	☐ Level IV	_
	الم مرا	Date / Tim	e Result	∤.≝	Stark	1-4-		Sequoia's Work Order #	ler#		
Turnaround V 10-15 W	S.		s	MANC	MANDATORY:			ANALYSES REQUESTED	<b>UESTED</b> (Please	(Please provide method)	
(		□ 48 Hours □ 24 Hours □ 2-8 Hours	ν ν <sub>δ</sub>	□ SDWA □ CWA(	SDWA (Drinking Water) CWA (Waste Water) RCRA (Hazardous Waste)	ater) ) Naste)		>			
Client	Date / Time	Matrix	# of		Sequoia's	1		To the		Comments/	7
1. Follogics 1, 3	4-17-0-51-p	<del>                                     </del>	-	8-08 Ja C		X	×	×		P209468-01	
Α,	12.71/20-E-B	1		_			•	•		(0)	20
	4-17-02/17 ' ur	,								7	
2 7 4	0-3/10-4-9	0	7					Je .		\$	7
*	3121/20-616									***	9 V
1 4	228/20-1-0	, l.								<i>3</i> 0-	💯
	945140-4-b									10-	[ ]
8. 7.	05E1/20-413	9								8-	<b>~</b> ⊘
	4-17-05/1400				N					\$	5
10. 43	574/20-424	<b>→</b>	-	>		<b>→</b>	<b>→</b>	<b>→&gt;</b>		01- /	$  \mathcal{V}  $
linguished					Received By:	0	D. 00		Date / Tin	Date / Time: 9 24 (2) 23	1 7
Relinquished By:	4.0	;			Received By:	0	<u> </u>		Date / Time:	ie:	
Relinquished By:					Received By:				Date / Time:	ie:	
Relinquished By:				_	Received By:				Date / Time:	ie:	!
Were Samples Received in Good Condition?	in Good Condition?	Xey Xes	°N □		Samples on Ice?	Yes 🗖 No	Method o	Method of Shipment: Fed	EX	Pageof	
		•									

Yellow: Sequoia



819 Striker Ave., Suite 8 • Sacramento, CA 93034 • (910) 921-9000 • FAX (910) 921-01551 industrial Road • San Carlos, CA 94070 • (650) 232-9600 • FAX (650) 232-9612 404 N. Wiget Lane • Walnut Creek, CA 94598 • (925) 988-9600 • FAX (925) 988-9673 300

AER

Sarina

Project:

Company Name:	Envisoret	Hwc.				Project:	Saripon	N AEK		
Mailing Address: 285	PAG	21年 日	7			Billing Address (if different):	ress (if diff	erent):		
I		Sta	١.	Zip Code: 9	31896					
1 '	1777-320	Fax# &	1	2- 528	2-31	P.O. #:				
3	200	1	ess:	1	Pleaser . r.	နော <sub>လ</sub> QC Data:	D Le	☐ Level II (standard)	) 🗖 Level III	☐ Level IV
4	100	Date / Time Results Red	Result	ַ⊒			Sedi	Sequoia's Work Order #	er#	2
*	10-15 Working Days	72 Hours		MAN	MANDATORY:		A	JALYSES REQ	ANALYSES REQUESTED (Please provide method)	provide method)
	d TAT) g Days	48 Hours 24 Hours 28 Hours			SDWA (Drinking Water) CWA (Waste Water) RCRA (Hazardous Waste)	ter)	Y.			
					Other	N. S.	\ X	/	\ \ \	\ \ \
Client Sample I.D.	Date / Time Sampled	Matrix Desc.	# of Cont.	Container Type	Sequoia's Sample #					Comments/ Temp.(If required)
170108965 42	9-13-02/1430	50 SED	783	8 02 8	D	¥	y	×		D304468-11
2. 4.(	SAN /rott	<u> </u>	-		15		J			K1-
3.		9								73
4 7	015120-41-6			<b>→</b>		a.		in the second		7 -
5.	0-51/28-6-6	07	7	2 4-02		3.130		JOE	JOLER CUSTODY SEALS INTACT	ALSINTACTE -15
	0h51/20-t1-b	0	~			CEC				NOTINIARTI - 16
6.	0251/20-6-1	9	2					000	MPERATURE	RE 4,0 en
8. 6,(	2001/2047P	7 50	7	<b>&gt;</b>		<u>~</u> >>	->	-7		81-7
ó		•	7							
10.						٥				-
Relinquished Bv: //	1.st 105				Received By:	700			Date / Time:9	e:9 24 000 KT3
Relinquished By:					Received By:	9 / E			Date / Time:	e: 1 1
Relinquished By:					Received By:			-	Date / Time:	e:
Relinquished By:					Received By:				Date / Time:	e.
Were Samples Received in Good Condition?	in Good Condition	l? □ Yes	S O	Samples on Ice?		Yes 🛮 No 🛚	Method of Shipment:	hipment:		Page of of

White: Sequoia

Yellow: Sequoia



### **STL Burlington**

208 South Park Drive Suite 1 Colchester, VT 05446

Tel: 802 655 1203 Fax: 802 655 1248 www.stl-inc.com

October 22, 2002

Mr. Matt Neal Environet 2850 Paa Street Suite 212 Honolulu, HI 96819

Re: Laboratory Project No. 22000

SDG: 89891

Dear Mr. Neal:

Enclosed are the analytical results of samples received intact by Severn Trent Laboratories on September 25, 2002. Laboratory numbers have been assigned and designated as follows:

<u>Lab ID</u>	Client Sample ID	Sample <u>Date</u>	Sample <u>Matrix</u>
	Received: 09/25/02	2 ETR No: 89891	
502104	F01009 LS 1,3	09/17/02	Solid
502105	F01009 LS 1,2	09/17/02	Solid
502106	F01009 LS 1,1	09/17/02	Solid
502107	F01009 LS 2,3	09/17/02	Solid
502108	F01009 LS 2,2	09/17/02	Solid
502109	F01009 LS 2,1	09/17/02	Solid
502110	F01009 LS 3,3	09/17/02	Solid
502111	F01009 LS 3,2	09/17/02	Solid
502112	F01009 LS 3,1	09/17/02	Solid
502113	F01009 LS 4,3	09/17/02	Solid
502114	F01009 LS 4,2	09/17/02	Solid
502115	F01009 LS 4,1	09/17/02	Solid
502116	F01009 LS 5,3	09/17/02	Solid
502117	F01009 LS 5,2	09/17/02	Solid
502118	F01009 LS 5,1	09/17/02	Solid
502119	F01009 LS 6,3	09/17/02	Solid
502120	F01009 LS 6,2	09/17/02	Solid
502121	F01009 LS 6,1	09/17/02	Solid

Mr. Matt Neal September 27, 2002 Page 2 of 2



**STL Burlington** 

The continuing calibration sample analyzed on 10/3/02 at 2310 hours exhibited percent differences for BZ#77 and BZ#153 outside of the established quality control limits on the RTX-5 column. Congeners BZ#77 and BZ#118 also yielded percent differences slightly outside of the established quality control limits on the RTX-CLPII column.

If there are any questions regarding this submittal, please contact Chris Anderson at (802) 655-1203.

This report shall not be reproduced, except in full, without the written approval of the laboratory. This report is sequentially numbered starting with page 0001 and ending with page 0094

I certify that this package is in compliance with the NELAC requirements, both technically and for completeness, for other than the conditions detailed above. The Laboratory Director or his designee, as verified by the following signature has authorized the release of the data contained in this hardcopy data package.

Sincerely,

, for: Michael F. Wheeler, Ph.D.

Laboratory Director

Enclosure



**STL Burlington** 

### **PCB CONGENER ANALYSIS**

### Qualifier Definitions:

- U= Compound not detected above reporting limit.
- J= Compound reported at an estimated concentration below the reporting limit.
- E= Compound reported at an estimated concentration which exceeds the calibration range.
- S= Specific column result used for quantitation due to confirmation column coelution.
- T= Tentative identification, specific column result used with no confirmation information.
- X= Estimated concentration due to coelution on both columns.
- P= Confirmation column result exceeds reported result by more than 25%.
- H= Specific column or estimated result exceeds confirmation result by more than 25% despite expected confirmation coelution.
- B= Compound detected above reporting limit in method blank.
- N= Compound does not comply with initial and/or ongoing calibration criteria.

0002



Severn Trent Laboratories, Inc.

## **Analytical Results for Wet Chemistry**

**STL Burlington** 

208 South Park Drive, Suite 1 Colchester, VT 05446

Tel: 802 655 1203 Fax: 802 655 1248



**STL Burlington** 

## Analytical Report

Environet 2850 Paa Street Suite 212

Honolulu, HI 96819

Attention : Matt Neal

Date : 10/01/02 ETR Number : 89891 Project No.: 22000 No. Samples: 18

Arrived : 09/25/02

Page 1

Case:22000 SDG:89891

Standard analyses were performed in accordance with Methods for Analysis of Water and Wastes, EPA-600/4/79-020, Test Methods for Evaluating Solid Waste, SW-846, or Standard Methods for the Examination of Water and Wastewater.

All results are in mg/l unless otherwise noted.

	thod No.	Sample Description/ Parameter	Result
502104	F01009 IN623	LS 1,3:09/17/02 @1220(Solid) Solids, Percent	75.4 c
502105	F01009 IN623	LS 1,2:09/17/02 @1234(Solid) Solids, Percent	74.0 c
502106	F01009 IN623	LS 1,1:09/17/02 @1245(Solid) Solids, Percent	76.5 c
502107	F01009 IN623	LS 2,3:09/17/02 @1300(Solid) Solids, Percent	75.0 c
502108	F01009 IN623	LS 2,2:09/17/02 @1315(Solid) Solids, Percent	76.0 c
502109	F01009 IN623	LS 2,1:09/17/02 @1325(Solid) Solids, Percent	74.0 c
502110	F01009 IN623	LS 3,3:09/17/02 @1340(Solid) Solids, Percent	74.6 c
502111	F01009 IN623	LS 3,2:09/17/02 @1350(Solid) Solids, Percent	63.5 c

Comments/Notes

c = %W/W as received

< Cont. Next Page >

Doof 0005

STL Burlington

208 South Park Drive, Suite 1 Colchester, VT 05446

Tel: 802 655 1203 Fax: 802 655 1248



## Analytical Report

Environet 2850 Paa Street Suite 212

Honolulu, HI 96819

Attention : Matt Neal

Date : 10/01/02 ETR Number : 89891 Project No.: 22000 No. Samples: 18

Arrived : 09/25/02

Page 3

Case:22000 SDG:89891

Standard analyses were performed in accordance with Methods for Analysis of Water and Wastes, EPA-600/4/79-020, Test Methods for Evaluating Solid Waste, SW-846, or Standard Methods for the Examination of Water and Wastewater.

Lab No./	hod No.	Sample Description/ Parameter	Result
502120	F01009 IN623	LS 6,2:09/17/02 @1550(Solid) Solids, Percent	66.7 c
502121	F01009 IN623	LS 6,1:09/17/02 @1605(Solid) Solids, Percent	65.9 c

Comments/Notes

c = %W/W as received

< Last Page >

Submitted By 6

STL Burlington



Severn Trent Laboratories, Inc.

## PERCENT SOLIDS

Date In: 9 / 26/02	(Method IN623)
Time In: 1400	Date Out: 9/27/02
Analyst:	Time Out: 1100
7000/	Analyst: Mhy

LAB ID	11	Mass of Dish	Mass of Disk 9	T 10
plus EPA ID	Dish#	(g)	Mass of Dish & Wet Sample (g)	
502049	19	096	14.22	12.74
502050	20	095	15.06	1354
502051	21	096	14.57	13.35
502052	22	0.99	1327	11.53
502053	23	0.99	14.18	1280
502654	24	0.99	10.31	8-84
502055	25	099	8.54	747
502056	26	0.99	13.05	10.89
502057	27	0.99.	10.16	8-68
502058	28	099	14.72	13.49
502658ms				13.47
502058 mg				
502059	29	099	1092	9.50
502060	30	099	1374	1152
502104	31	091	14-09	10.86
502105	32	097	1314	9-98
502106	33	-	13:33	13.49
502107	34	092	11.62	8-96
502108	35		1358	1055
502109	36	097	11.06	8.44
Entered by: MN		9/ \\/\/		

Entere	d by:_	m	1/1/	_
Date:				

%W/W = grams dry X 100 grams wet

Batch: DL

grams dry = weight of dry sample (g) - weight of dish (g) grams wet = weight of wet sample (g) - weight of dish (g)

0201

Aquatec, Inc. --- PERCENT SOLID REPORT --- 30-SEP-2002 14:34:41 --- ASW

Method: IN623 Batch: DL

Analyst: MNT Date Entered: 09-27-02

Entered by: MNT

Date/Time in: 09/26/02 1640

Date Verified: 09-30-02

Date/Time out: 09/27/02 1100 Verified by: ASW

- 1	Mass of	Mass of Dish a		of Dish and	Percent
Lab ID	Dish (g)	Wet Sample (g	) Dry	Sample (g)	Solid
=======	=======	==========	== =====		=======
502049	0.96	14.22		12.74	88.8386
502050	0.95	15.06		13.54	89.2275
502051	0.96	14.57		13.35	91.0360
502052	0.99	13.27		11.53	85.8306
502053	0.99	14.15		12.80	89.7416
502054	0.99	10.31		8.84	84.2275
502055	0.99	8.54	· # 360 500	7.47	85.8278
502056	0.99	13.05		10.89	82.0896
502057	0.99	10.16		8.68	83.8604
502058	0.99	14.72		13.49	91.0415
502058MD	0.99	14.72		13.49	91.0415
502058MS	0.99	14.72		13.49	91.0415
502059	0.99	10.92		9.50	85.6999
502060	0.99	13.74		11.52	82.5882
502104	0.96	14.09		10.86	75.3998
502105	0.97	13.14		9.98	74.0345
502106	0.97	17.33		13.49	76.5281
502107	0.97	11.62		8.96	75.0235
502108	0.97	13.58		10.55	75.9715
502109	0.97	11.06	•	8.44	74.0337

### **Percent Solids Benchsheet**

(Method IN623)

Date In: 9/26/02	_ Date Out: 9/27/02
Time In: 1640	Time Out: 1100
Analyst: Min	Analyst:

LAB ID		Mass of Dish	Mass of Dish &	
plus EPA ID	Dish#	(g)	Wet Sample (g)	Mass of Dish &
		(5)	Trot outliple (g)	Dry Sample (g)
502110	37	097	1680	1278
502111	38	097	1235	8-20
502112	39	097	1204	. 9-29
502113	40	096	1250	8-75
502114	41	0.97	1299	9.47
502115	42	097	15.34	11.46
502116	43	097	1733	14.05
502117	44	097	18.00	1389
502118	45	097	1336	8.67
502119	46	098	1636	12.72
502120	47	098	14.30	9-87
502121	48	098	18-06	12-23
502125	- 49	097	9.74	9.86
502126	50	097	682	4.69
502127	57	098	840	5.89
502128	52	098	624	361
502128m				
502128MD				- A
5021210	53	0.98	7.47	634
502217	54	097	1208	9.42

Entered by: MNN	%W/W = grams dry X 100	
Date: 9/27/02	grams wet	-111
Ratch: Die		,

grams dry = weight of dry sample (g) - weight of dish (g)

grams wet = weight of wet sample (g) - weight of dish (g) 0.010

Aquatec, Inc. --- PERCENT SOLID REPORT --- 30-SEP-2002 14:34:59 --- ASW

Method: IN623 Batch: DM

Analyst: MNT Date Entered: 09-27-02

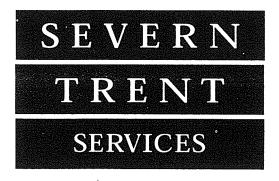
Entered by: MNT

Date/Time in: 09/26/02 1640

Date Verified: 09-30-02

Date/Time out: 09/27/02 1100 Verified by: ASW

Mass of Lab ID Dish (g)	Mass of Dish and Wet Sample (g)	Mass of Dish and Dry Sample (g)	Percent Solid
=======================================	=======================================	=======================================	74 6050
502110 0.97	16.80	12.78	74.6052
502111 0.97	12.35	8.20	63.5325
502112 0.97	12.04	9.29	75.1581
502113 0.96	12.50	8.79	67.8510
502114 0.97	12.99	9.47	70.7155
502115 0.97	15.34	11.46	72.9993
502116 0.97	17.33	14.05	79.9511
502117 0.97	18.00	13.89	75.8661
502118 0.97	13.36	8.67	62.1469
502119 0.98	16.36	12.72	76.3329
502120 0.98	14.30	9.87	66.7417
502121 0.98	18.06	12.23	65.8665
502125 0.97	9.74	9.56	97.9476
502126 0.97	6.82	4.69	63.5897
502127 0.98	8.40	5.89	66.1725
502128 0.98	6.24	3.61	50.0000
502128MD 0.98	6.24	3.61	50.0000
502128MS 0.98	6.24	3.61	50.0000
502140 0.98	7.47	6.34	82.5886
502217 0.97	12.08	9.42	76.0576



**Severn Trent Laboratories, Inc.** 

# PCB CONGENERS QC SUMMARY

## FORM 2 SOIL OTHER SURROGATE RECOVERY

Lab Name: STL BURLINGTON Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

CLIENT				ניים ה			I mom
CAMDIE NO	S1 1		S2 1	S2 2		OTHER	TOT
SAMPLE NO.			, ,,		` '		OUT
DDIRO				!	=====	======	===
						ļ	0
· · · · ·							0
		-					0
						ļ	0
				!			0
							0
				!			0
							0
				96			0
	!			99			0
F01009LS32	96	94	96	91			0
PIBLK_SCU	98	96	101	98			0
F01009LS31	102	100	103	98			0
F01009LS43	90	88	101	96			0
F01009LS42	81	80	96	91			0
F01009LS41	96	94	97	93			oi
F01009LS53	97	95	98	94			oi
F01009LS52	97	96	98	94			ol
F01009LS51	97	95	98	92			oi
F01009LS63	92	90	92	89 İ			0
F01009LS62	103	101	104	98			οİ
F01009LS61	103	101 j	103	98			οĺ
	j	i	i	i		i	1
			i				
		i					
			i		——		
					—		
	F01009LS31 F01009LS43 F01009LS42 F01009LS41 F01009LS53 F01009LS52 F01009LS51 F01009LS63 F01009LS62	PBLKO8 97 O8LCS 90 O8LCSD 93 F01009LS13 95 F01009LS12 95 F01009LS11 96 F01009LS23 101 F01009LS22 97 F01009LS33 102 F01009LS32 96 F01009LS32 96 PIBLK_SCU 98 F01009LS31 102 F01009LS41 90 F01009LS42 81 F01009LS42 81 F01009LS53 97 F01009LS53 97 F01009LS53 97 F01009LS53 97 F01009LS51 97 F01009LS51 97 F01009LS63 92 F01009LS63 92 F01009LS62 103	PBLKO8 97 96 O8LCS 90 89 O8LCSD 93 92 F01009LS13 95 94 F01009LS11 96 96 F01009LS23 101 102 F01009LS22 97 96 F01009LS33 102 100 F01009LS32 96 94 F01009LS32 96 94 PIBLK_SCU 98 96 F01009LS31 102 100 F01009LS31 102 100 F01009LS31 90 88 F01009LS42 81 80 F01009LS42 81 80 F01009LS53 97 95 F01009LS53 97 95 F01009LS51 97 95 F01009LS51 97 95 F01009LS63 92 90 F01009LS63 92 90 F01009LS62 103 101	PBLKO8 97 96 96 O8LCS 90 89 92 O8LCSD 93 92 96 F01009LS13 95 94 94 F01009LS11 96 96 97 F01009LS23 101 102 101 F01009LS22 97 96 100 F01009LS33 102 100 104 F01009LS32 96 94 96 PIBLK_SCU 98 96 101 F01009LS31 102 100 103 F01009LS31 102 100 103 F01009LS31 96 94 96 PIBLK_SCU 98 96 101 F01009LS31 90 88 101 F01009LS42 81 80 96 F01009LS43 90 88 101 F01009LS53 97 95 98 F01009LS51 97 95 98 F01009LS51 97 95 98 F01009LS63 92 90 92 F01009LS63 92 90 92 F01009LS62 103 101 104	PBLKO8 97 96 96 94 96 94 96 91 96 96 94 96 96 94 96 96 97 93 96 96 97 93 96 96 97 93 96 96 97 93 96 96 97 93 96 96 97 93 96 96 97 93 96 96 97 93 96 96 97 93 96 96 97 96 97 96 97 96 97 96 98 96 91 96 91 96 91 97 97 97 97 97 97 97 97 97 97 97 97 97	PBLKO8 97 96 96 94 96 94 97 95 98 94 96 91 96 96 97 93 96 94 96 96 97 96 96 97 96 96 97 97 96 96 97 97 97 97 97 97 97 97 97 97 97 97 97	PBLKO8 97 96 96 94 97 96 96 94 97 96 96 94 97 98 96 97 98 97 96 97 98 97 98 97 98 97 98 98 98 98 98 98 98 98 98 98 98 98 98

### ADVISORY QC LIMITS

S1 = Tetrachloro-meta-xylen (30-150)

S2 = BZ#198 (30-150)

# Column to be used to flag recovery values

\* Values outside of QC limits

D Surrogate diluted out

page 1 of 1

FORM II OTHER

### FORM 3 SOIL OTHER LAB CONTROL SAMPLE

Lab Name: STL BURLINGTON

Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

Matrix Spike - Sample No.: O8LCS

	SPIKE	SAMPLE	LCS	LCS	QC.
	ADDED	CONCENTRATION	CONCENTRATION	%	LIMITS
COMPOUND	(ug/Kg)	(ug/Kg)	(ug/Kg)	REC #	REC.
=======================================	========	==========	==========	=====	=====
BZ#8	33		29	88	40-150
BZ#18	33		29	88	40-150
BZ#28	33	U	28	85	40-150
BZ#44	33		29	88	40-150
BZ#52	33		29	88	40-150
BZ#66	33	%	28	85	40-150
BZ#77	33		28	85	40-150
BZ#101	33		29	88	40-150
BZ#105	33		28	85	40-150
BZ#118	33		28	85	40-150
BZ#126	33		28	85	40-150
BZ#128	33		29	88	40-150
BZ#138	33		29	88	40-150
BZ#153	33	si .	29	88	40-150
BZ#170	33		28	85	40-150
BZ#180	33		28	85	40-150
BZ#187	33		29	88	40-150
BZ#195	33		29	88	40-150
BZ#206	33		29	88	40-150
BZ#209	33	•	29	88	40-150

- # Column to be used to flag recovery and RPD values with an asterisk
- \* Values outside of QC limits

COMMENTS:		 	9	
		•		

### FORM 3 SOIL OTHER LAB CONTROL SAMPLE

Lab Name: STL BURLINGTON

Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.:

SDG No.: 89891

Matrix Spike - Sample No.: O8LCS

	SPIKE	LCSD	LCSD			
	ADDED	CONCENTRATION	%	ક	QC L	IMITS
COMPOUND	(ug/Kg)	(ug/Kg)	REC #	RPD #	RPD	REC.
=======================================	=======	==========	=====	=====	=====	=====
BZ#8	33	32	97	10	40	40-150
BZ#18	33	32	97	10	40	40~150
BZ#28	33	32	97	13	40	40-150
BZ#44	33	32	97	10	40	40-150
BZ#52	33	32	97	10	40	40-150
BZ#66	33	32	97	13	40	40-150
BZ#77	33	31	94	10	40	40-150
BZ#101	33	32	97	10	40	40-150
BZ#105	33	32	97	13	40	40-150
BZ#118	33	32	97	13	40	40-150
BZ#126	33	32	97	13	40	40-150
BZ#128	33	33	100	13	40	40-150
BZ#138	33	32	97	10	40	40-150
BZ#153	33	32	97	10	40	40-150
BZ#170	33	32	97	13	40	40-150
BZ#180	33	31	94	10	40	40-150
BZ#187	33	33	100	13	40	40-150
BZ#195	33	32	97	10	40	40-150
BZ#206	33	32	97	10	40	40-150
BZ#209	33	32	97	10	40	40-150
		6				

<sup>#</sup> Column to be used to flag recovery and RPD values with an asterisk

RPD: 0 out of 20 outside limits

Spike Recovery: 0 out of 40 outside limits

COMMENTS:						
	 -		 	 	 	 

<sup>\*</sup> Values outside of QC limits

## FORM 4 OTHER METHOD BLANK SUMMARY

PBLKO8

Lab Name: STL BURLINGTON Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

Lab Sample ID: PBLKO8 Lab File ID: 03OCT021608-R011

Matrix (soil/water) SOIL Extraction: (SepF/Cont/Sonc) SOXH

Sulfur Cleanup (Y/N) Y Date Extracted: 09/26/02

Time Analyzed (1): 2355 Time Analyzed (2): 2355

GC Column (1): RTX-5 ID: 0.25(mm) GC Column (2): RTX-CLPII ID: 0.25(mm)

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

			LAB	DATE	DATE
		SAMPLE NO.	SAMPLE ID	ANALYZED 1	ANALYZED 2
		=========	=========		=======
	01	O8LCS	O8LCS	10/04/02	10/04/02
	02	O8LCSD	O8LCSD	10/04/02	10/04/02
	03	F01009LS13	502104	10/04/02	10/04/02
	04	F01009LS12	502105	10/04/02	10/04/02
	05	F01009LS11	502106	10/04/02	10/04/02
	06	F01009LS23	502107	10/04/02	10/04/02
	07	F01009LS22	502108	10/04/02	10/04/02
*	80	F01009LS21	502109	10/04/02	10/04/02
	09	F01009LS33	502110	10/04/02	10/04/02
	10	F01009LS32	502111	10/04/02	10/04/02
	11	F01009LS31	502112 .	10/04/02	10/04/02
*	12	F01009LS43	502113	10/04/02	10/04/02
*	13	F01009LS42	502114	10/04/02	10/04/02
	14	F01009LS41	502115	10/04/02	10/04/02
	15	F01009LS53	502116	10/04/02	10/04/02
	16	F01009LS52	502117	10/04/02	10/04/02
	17	F01009LS51	502118	10/04/02	10/04/02
	18	F01009LS63	502119	10/04/02	10/04/02
	19	F01009LS62	502120	10/04/02	10/04/02
	20	F01009LS61	502121	10/04/02	10/04/02
	21				
	22			F1 1	
	23				
	24				

COMMENTS: \* Sample received an additional sulfur cleanup. Associated sulfur cleanup blank is PIBLK\_SCU.

page 1 of 1



**Severn Trent Laboratories, Inc.** 

## PCB CONGENERS SUPPORTIVE DOCUMENTATION

See a Company of the company of the

STL Burlington - Target GC Injection Report

51			4			Extract			
Peak No.	Peak RT	Expected RT	Delta RT	3	Wasi alah	Conc.	D1		Deals Times Einstein
NO.	KI	=======	K1	Area	Height	(ppb)	Flags		Peak Identification
56	14.612		======	5188	1181				=======================================
57	14.832			450	93				
58	15.995			2255	261				
59	16.255			17554	1991				8
60	17.306			2129	269				
61	17.999			1943	432				
62	18.414			577	99				
63	19.775			1203	229				
64	20.435			979	183				
65	20.766			2586	333				
66	21.938			851	170				
67	22.260			766	138				
\$ 68	22.539	22.559	-0.020	329890	65035	43.5918		BZ#198	
69	23.361			1482	270				
70	24.640			548	113				
71	25.228			877	129				
72	25.658			1103	171				
73	25.793			755	136				
74	27.635			2275	247				
75	27.890			1145	197				
76	28.059			871	157				
77	28.327			4699	920				
78	28.484			1234	200				
79	28.823			1908	238				
80	29.145			4642	347				
81	29.375			1888	222				
82	29.830			4363	339				
83	30.508			2197	346				
84 85	30.863			388	71				
86	31.472			568	134				
87	31.612 31.721			402 2085	104 333				
88	31.721			505	148				
89	32.217			8658	2017				
90	32.485			432	119				
91	32.567			496	121				
92	32.780			5532	996				
93	32.873			2448	461				
94	33.002			2355	453				
95	33.210			2083	488				
96	33.292			4411	534				
97	33.494			17086	2372				
98	34.119			1594	376				
99	34.700			4040	518				
100	35.134			655	207				
101	35.254			2735	316				
102	35.484			2550	384				
103	35.624			1519	233				
104	36.256			252	67				
105	36.593			1392	256				
106	36.748			314	90				
107	37.058			1042	180				
108	37.464			847	159				
109	39.058			1021	191				

Flags: A - Peak quantitates above calibration range

-- 0021

a - Peak quantitates below reporting limit

H - User selected alternate compound hit

M - Peak manually integrated or manually identified

R - Peak fails recovery
U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

Lab Sample ID: 502106 Client Sample ID: F01009LS11

Matrix : SOIL

Sample Type : SAMPLE
Injection Date : 04-OCT-2002 03:40
Dilution Factor : 1.00 Instrument : 3327\_1.i
Column : RTX-5
Integrator

Data File : 03oct021608-r061.d

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_1.i/100302\_1/03OCT021608.b/32CONG\_3327RTX5\_RAW.m

Reported : 17-Oct-2002 09:43 rrm

Peaks

Peak	Peak	Expected	Delta			Extract Conc.		
No.	RT	RT	RT	Area	Height	(ppb)	Flags	Peak Identification
=====	=======	=======	=======			========	====	************************
1				6323710	969798			
2				394917	48321			
3				19918	2670			
<b>4</b> 5				2956 5890	806 962			
6				2235	547			
7				3660	785			
8				608	150			
9				247	94	• ••		
10	2.913			17391	4492			
11	3.090			8174	1587			
12	3.256			7467	1109			
13				2594	589			
14				1904	511			
15				10033	3360			
16				1387	357			
17 18	3.972 4.385			7832 5623	2405 2050			
19				571	174			
20				2737	987			
21				252	79			
\$ 22		5.001	-0.016	342839	136346	43.2615		Tetrachloro-meta-xylene
23	5.158			7318	1522			,
24	5.462			312	114			
25	5.568			3961	1404			
26				678	247			
27				860	290			
28	6.027			379	140			
29	6.209			238	70			
30 31	6.342 6.537			698 2834	174 833			
32				4178	1299			
33	7.240			351	124			
34				1508	374			
35	7.616			377	140			
36	7.752			3142	692			
37	7.931	7.925	0.007	2719	712	0.674885	a	BZ#28
38	8.073			2070	366			
39				612	198			
40				1233	386			
41				2022	600			
42 43				1721 337	295 91			
44				6619	1309			
45				2290	489			
46				1585	210			
47				5244	1032			
48	11.476			671	181			
49	11.589			<b>1</b> 359	315			
50	11.779			598	142			
51				1319	275			
52				3524	648			
53				663	122			
54	13.451			1034	~ ~ 165 <u>~</u>	020		
55	13.841			1401	126	111/11		

Client Sample ID: F01009LS11

Lab Sample ID: 502106

	(1,195)				<del>(0,89</del> 3)		
(1) (660) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)							
3:675) 513-250) 13-250)							
23:6733 27:6733 27:6733 27:6733 27:6733						•	
(4,385) (4,584) (4,692)			Tokasahla	ro-noto-kylene	<del>(4,98</del> 5)		
元·668) [5·682]				o mad ngoon		¤ ₹ H	ΩH
2:264 (6:837)						Integr Method Report	Instru Column
5(7,020) 57,380) 7,380)						Integrat Method Reported	Instrum Column
7,020) 7,149) 1,149) 1,241,(7,931)						Integrator Method Reported	Instrument Column
18,969) F(9,237) T9,627)					2	Ř	ίt
19.62/7 110.319							
						부>평	φω
11:536) 11:592)						Falcon /var/chem/3 17-Oct-2002	3327_7
(12,418) (12,872)						on /cl ct-	ហ្គ
(13,451) (13,841)						1em -20	<b>.</b>
E(14,612) BZ#123 (14,832)			*** 80			Falcon /var/chem/3327   17-Oct-2002 09	
						09	
(15.995) >(16.255) -						27_1. 09:43	
(17,306)					<b>.</b>	х Т	
(17,999) (18,414)					ultic	7100 /100	Da Da
					NO.	30% 30%	lut
(19,775) (20,435)					E 030	oun 2_1	Dilution Facto Data File
(20,435) (20,766)					ct0211	/03 / 03	n I
(21,938) (22,260)					HultiChrom GC 03oct021608.i061	Compound Sublist: ENV 100302_1/030CT021608.b	Dilution Factor Data File
F		——BZ#198 (22.539)			2	lis [02	cor
(23,361)						160	
<u>(24,640)</u>						)8.]	1.00
(25,228) (25,958)						~ z (	1.00 03oct02
						32CONG	0
(27.635) 127.690)						DNC	1608
(27.635) (27.839) (28.859) (28.857) (28.823)						<sup>1</sup> ω '	1
(23:3 <del>/</del> 5)					1	327	r061.
(29,830)						RTY	1.d
C30,863)						G '	
(32, 227) (32, 227) (32, 227) (33, 494) (33, 494)						27RTX5_RAW.m	
						7. m	
(33,494) (434,119)			39				
2(34,700)							
(35.134) (35.624)							
136.256) 136.788)	.t -4						
(37,058) (37,464)	•						
339.058)		· · · · · · · · · · · · · · · · · · ·	010				
1		U	019				

## FORM 1 OTHER ORGANICS ANALYSIS DATA SHEET

ENVNET SAMPLE NO.

F01009LS11

Q

Lab Name: STL BURLINGTON Contract: 22000

CAS NO. COMPOUND

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

Matrix: (soil/water) SOIL Lab Sample ID: 502106

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 030CT021608-R061

% Moisture: 24 decanted: (Y/N) N Date Received: 09/25/02

Extraction: (SepF/Cont/Sonc) SOXH Date Extracted: 09/26/02

Concentrated Extract Volume: 10(mL) Date Analyzed: 10/04/02

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: \_\_\_ Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/KG

34883-43-7----BZ#8 2.2 U 37680-65-2----BZ#18 2.2 U 7012-37-5----BZ#28 2.2 U 41464-39-5----BZ#44 2.2 U 35693-99-3----BZ#52 2.2 U 32598-10-0----BZ#66 2.2 U 32598-13-3----BZ#77 2.2 U 37680-73-2----BZ#101 2.2 U 32598-14-4----BZ#105 2.2 U 31508-00-6----BZ#118 2.2 U 57465-28-8----BZ#126 2.2 U 38380-07-3----BZ#128 2.2 U 35065-28-2----BZ#138 2.2 U 35065-27-1----BZ#153 2.2 U 35065-30-6----BZ#170 2.2 U 35065-29-3----BZ#180 2.2 U 52663-68-0----BZ#187 2.2 U 52663-78-2----BZ#195 2.2 U 40186-72-9----BZ#206 2.2 U 2051-24-3----BZ#209 2.2 U

FORM I OTHER

### STL Burlington - Target GC Injection Report

 	Peak RT	Expected RT	Target Compound  Target Compounds		
	Peak	Expected			
	RT	RT	Target Compound	6	
		=======			
	4.985	5.001	Tetrachloro-meta-xylene		
		5.761	BZ#8		
		6.701	BZ#18		
	7.931	7.925	BZ#28		
		8.984	BZ#52		
		9.667	BZ#44		
		11.243	BZ#66		
		12.207	BZ#101		
		13.752	BZ#77		
		14.938	BZ#118		
		15.993	BZ#153		
		16.155	BZ#105		
		17.328	BZ#138		

17.762

18.647

20.781

22.271

22.559

24.552

27.655

29.180

22.539

BZ#126

BZ#128

BZ#180

BZ#170

BZ#198

BZ#195

BZ#206

BZ#209

		(1,250)			(0,958)			
	2-4	\$(1,818) ;(2,148) [2,427]	da non					
	3	**************************************						
	4 Santas	T2.2.449) [2.427] [3.006] [3.006] [3.227] [3.2						
	AVEX IN	5,227) \$5,970, £,621, £,631,		- Tetrachiero neta ny	lene-45,39¢>	Co. In: Rej	Mat Ana	Lab
	4	(100) (100)				Instrume Column Integrat Method Reported	Matrix Analyst	
	STRIZIN	(7,852) 7,818) 8,171) 9,188)				Column Integrator Method Reported	, t	Sample
		7.8189 6.171) 6.663 6.663 6.7853				H in	r	e ID
	° #	19:373)				 >==============================		D: 5
Ì		10, 35(1) 12 (11, 380) 12, 028)				RTX-CL Falcon /var/c 17-Oct	CIO	0210
	27-F	12.028) 12.318) 12.678) (13.005)				TX-CLPII  Talcon  var/chem/3  7-Oct-2002	ა _	90
	12	13,398) 13;522)				II em/3 2002	1-	
	15-	<u>-</u> (15.406)		F*- 9		3327 2 09:		
		C16,457) ( <u>7</u> 16,882)			:	σ´2 •4•		
	7	(37,977)			Hult	1/10 1/10	1 14 70	
	-	±281587\18,724> ⇒(19,185)			iChron	Data Data Compo .00302	Sample Inject	Client
THE CHI	-8°	BZ#138 (19.693) 1(20.2894)			EC 03oc	Data File Compound : 00302_1/0: m	Sample Ty	
12	12-	<u>720,555)</u> <u>721,045)</u> <u>828128 (21,455)</u>			HiltiChrom GC 0300t021608,1061	0 0	12 × 1	Sample
	Ν.	(221,903) (222,450) (222,770)			1,1061	sublist	)e Date	
	23 24	EZ#180 (23,089)				st: 2160	·	ID:
	28	\$724,304) \$\$26170 (24,977)		-BZ#198 (24.658)		03oc ENVN 08.b/	SAI	F0.
	26				:	03oct02 03oct02 ENVNET 8.b/32C	SAMPLE 04-OCT-	F01009LS1
	27-	726,374) (26,644) (26,995)				216 CON	20	
	8-	727,657) 727,992) 728,395)				Ιω α	02 0	
	3-	123 : 821 \ 123 : 821 \ 123 : 831 \				r061. 327RT	)3:4	
	30 31	(30,071) (30,071) (30,071)				.d TXC	0	
	32	131.853) 131.855) 132.855)				061.d 27RTXCLPII		
	<u>ਬ</u> -	(32,878)				I RA		
	4-	(133, 363) 133, 367) 133, 367) 134, 639)				_RAW.m		
	36	(35,527) (53,635) (53,635) (235,527)						
	36	(36.160) (36.384) #36.884)						
	37 38	537.218) 537.683 538.105) 538.105)						
	u	(38,355)						

-- 0023

1.3

2,7

38 39-

8-

(39,417)

Lab Sample ID: 502106 Client Sample ID: F01009LS11

Sample Type : SAMPLE

Matrix : SOIL
Analyst : w
Instrument : 3327\_2.i Injection Date : 04-OCT-2002 03:40

Dilution Factor: 1.00

Column : RTX-CLPII Data File : 03oct021608-r061.d

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_2.i/100302\_1/03OCT021608.b/32CONG\_3327RTXCLPII\_RAW.m Reported : 17-Oct-2002 09:54 rrm

_					Pe	eaks		
Peak No.	Peak RT	Expected RT	Delta RT	Area	Height	Extract Conc. (ppb)	Flags	Peak Identification
====				======	=======	(ppb/	=====	reak identification
1	0.958			8063389	969954			
2	1.250			651386	74482			
3	1.818			29447	2755			
4	2.148			14021	1577			
5	2.427			5147	551			
6	2.631			2917	644			
7	2.722			8831	1698			
8	3.006			538	174	•	e 2	
9 10	3.236			6010	1505			
11	3.354 3.491			26193 8280	5420			
12	3.669			1974	1492 582			
13	3.762			7503	1225			
14	3.919			2086	484			
15	4.054			16188	4749			
16	4.256			1955	328			
17	4.427			1322	370			
18	4.531			8320	2493			
19	4.690			7001	2494			
20	4.959			1178	169			
21	5.227			683	159			
22	5.380	5.391	-0.011	471619	162255	43.0460		Tetrachloro-meta-xylene
23	5.570			6501	1425	13.0100		recraemoto-meca-xyreme
24	5.792			1890	304			
25	6.016			12118	2387			
26	6.247			6502	1628			
27	6.424			357	123			
28	6.533			1279	244			
29	6.612			1143	259			
30	6.730			786	222			
31	6.889			860	177			
32	7.031			2904	868			
33	7.255			494	130			
34	7.324			1041	211			
35	7.552			4669	1426			
36	7.818			2490	362			
37	8.171			261	71			
38	8.452			1240	277			
39	8.525			3301	612			
40	8.680			789	257			
41	8.774			1511	282			
42	8.962			809	222			
43	9.084			2619	451		-	
44	9.341			1315	301			
45	9.443			3103	834			
46	9.545			7847	1319			
47	9.756			1417	237	7		
48	10.217			1374	266			
49	10.294			1 1705	482			
50	10.378			2367	455			
51	10.926			2686	336			
52	11.023			5640	1197			
53	11.239			2650	349			
54	11.380			20358	303	ロクオ		
55	12.028			1268	303()	U.C. 4		

_			n	Delte			Extract Conc.		
	ak Io.	Peak RT	Expected RT	Delta RT	Area	Height	(ppb)	Flags	Peak Identification
==		======			1220	=======		=====	
	56 57	12.318 12.531			1220 354	311 105			
	58	12.679			480	95			9.
	59	13.005			3591	608			
	60	13.398			535	101			
	61	13.752			847	163			
	62	13.921			477 7227	99 1412			
	63 64	15.406 16.457			462	91			
	65	16.882			2507	258			
	66	17.977			2443	343			
	67	18.587			1643	176	2 26163	_	P7#105
	68	18.724	18.720	0.004	1308 22643	179 2898	2.86163	a	BZ#105
	69 70	19.185 19.693	19.713	-0.020	6022	511	0.493629	a	BZ#138
	71	19.994			3837	640			
	72	20.200			3183	367			
	73	20.555			1051	177			
	74	21.045		0.007	1112 747	146 126	1.03395		BZ#128
	75 76	21.455 21.903	21.462	-0.007	1466	267	1.03373	4	D2#120
	77	22.450			1397	255			
	78	22.770			1057	144			
	79	23.089	23.115	-0.027	1730	344	0.595254	. a .	BZ#180
	80	24.304		0.000	3766 529936	531 99401	41.7408		BZ#198
\$	81 82	24.658 24.977	24.678 25.004	-0.020 -0.027	3532	427	0.946692	a	BZ#170
	83	26.374	23.004	0.027	1554	309			
	84	26.644			3113	289			
	85	26.995			815	136			
	86	27.657			517	52			
	87	27.992			1680 4450	165 321			
	88 89	28.395 28.841			4704	400			
	90	29.063			1546	216			
	91	29.284			284	42			
	92	29.446			821	174			
	93	29.546			1188 10547	198 1271			
	94 95	30.071 30.490			596	144			
	96	30.612			986	204			
	97	30.745			979	223			
	98	30.914			2526	395			
	99	31.470			5970 1250	356 216			
	100 101	31.601 31.865			7197	634			
	102	32.275			10282	465			
	103	32.403			1542	469			
	104	32.878			43744	3632			
	105	33.303			12408 8283	828 890			
	106 107	33.567 33.804			4656	540			
	108	34.039			8333	656			
	109	34.507			3367	460			
	110	34.609			12808	1920			
	111	34.806			3909 1749	394 261			
	112 113	35.125 35.241			2707	340			
	114	35.527			5277	955		·	
	115	36.160			2767	200			
	116	36.384			1815	263			
	117	36.724			500	129			
	118	36.803			1234 j <b>1</b> 646	207 236			
	119 120	37.218 37.683			1601				
	121	37.858			1020				
	122	38.105			804	145			
	123	38.355			1271				
	124	39.417	,		4164	350	0005		
							0025		

### STL Burlington - Target GC Injection Report

Flags: A - Peak quantitates above calibration range

- a Peak quantitates below reporting limit
- H User selected alternate compound hit
- $\ensuremath{\mathrm{M}}$  Peak manually integrated or manually identified
- R Peak fails recovery
- ${\tt U}$  User disabled peak  ${\tt ID}\colon$  either peak quantitates below reporting limit or peak identification not confirmed on second column

#### Target Compounds

Peak	Expected	
RT	RT	Target Compound
=======	=======	
5.380	5.391	Tetrachloro-meta-xylene
	6.592	BZ#8
	7.698	BZ#18
	9.137	BZ#28
	10.341	BZ#52
	11.312	BZ#44
	13.056	BZ#66
	13.914	BZ#101
	16.080	BZ#77
	17.075	BZ#118
	17.995	BZ#153
18.724	18.720	BZ#105 W
19.693	19.713	BZ#138
	20.225	BZ#126
21.455	21.462	BZ#128
23.089	23.115	BZ#180
24.658	24.678	BZ#198
24.977	25.004	BZ#170
	27.203	BZ#195
	29.805	BZ#206
	30.754	BZ#209

# FORM 1 OTHER ORGANICS ANALYSIS DATA SHEET

ENVNET SAMPLE NO.

2.2 U

F01009LS12

Lab Name: STL BURLINGTON Contract: 22000

COMPOUND

CAS NO.

2051-24-3----BZ#209

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

Matrix: (soil/water) SOIL Lab Sample ID: 502105

Sample wt/vol: 30.0 (q/mL) G Lab File ID: 030CT021608-R051

% Moisture: 26 decanted: (Y/N) N Date Received: 09/25/02

Extraction: (SepF/Cont/Sonc) SOXH Date Extracted: 09/26/02

Concentrated Extract Volume: 10 (mL) Date Analyzed: 10/04/02

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: \_\_\_ Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/KG

2.2 U 34883-43-7----BZ#8 37680-65-2----BZ#18 2.2 U 2.2 U 7012-37-5----BZ#28 2.2 U 41464-39-5----BZ#44 2.2 U 35693-99-3----BZ#52 2.2 U 32598-10-0----BZ#66 2.2 U 32598-13-3----BZ#77 2.2 U 37680-73-2----BZ#101 2.2 U 32598-14-4----BZ#105 2.2 U 31508-00-6----BZ#118 2.2 U 57465-28-8----BZ#126 2.2 U 38380-07-3----BZ#128 2.2 U 35065-28-2----BZ#138 2.2 U 35065-27-1----BZ#153 2.2 U 35065-30-6----BZ#170 2.2 U 35065-29-3----BZ#180 2.2 U 52663-68-0----BZ#187 2.2 U 52663-78-2----BZ#195 40186-72-9----BZ#206 2.2 U

FORM I OTHER

٠	•=	<del>(4)</del> , 2586)	(1,210)					
,		1:8623 3:3620					(a)	
	TAS TRUMPAN	(7.01)	(2,922)		Tahasah laus sah		-	
	THE PERSON	7-3-47 (5-5-75) (1-3-5) (1-3-5) (7-0-33)				<del>- Hylene (1,999</del> )	Matrix Analyst Instrume Column Integrat Method Reported	Lab S
0	o~ l	(7,033) ,397) \$697 \$687 \$188 \$188 9-255					Matrix Analyst Instrument Column Integrator Method Reported	Sample
10 11	E	2.555) (10.336) 11. <del>5</del> 64)					: SOIL : 3327 : RTX-5 : Falco : /var/ : 17-00	ID: 50
1	1 KI	12,440) 13,335) 2077 (13,788)					SOIL 3327_1.i RTX-5 Falcon /var/chem/3 17-Oct-2002	502105
15	≥ĭ B	14.630) Z8114 (15.457) 16.007) >(16.286)					/3327_1. 02_09:43	
10		<del>17:325</del> ) :18.015)				Hu1 t I Chrom	i/1	C1:
Time (Hin)	7 E	19,143) 19,788) 20,449) 20,781)				om GC 03oct021608,i051	ole atti	Client Sa
2 23	. k	21,468) (21,952) 22,271) 		BZ#198 (22,550)		608,1051	or 021	Sample ID
	- H	(24.652) (25,228) (25,678)					: SAMPLE : 04-OCT-2 : 1.00 : 03oct021 : ENVNET : ENVNET	: F01009LS
	7	26,908) 27,653) 28,872) (28,374) (28,374)					ET-2002 021608- TT 2CONG_3	)9LS12
٤		(29,160) (29,575) ((29,843) (					02:55 r051.d 327RTX5	
8	; ;- ;-	(20, 978) (23, 151) (23, 151) (24, 152) (23, 151) (23, 151) (23, 151) (23, 151) (23, 151)					5_RAW.m	
34 30 36	100	7734,700) T05,272) 138:889)				- 0		
3/ 38	l- l-	136,606) (37,065)						

0.9

1.0-

1.1.

1.5

• 7 an wa 9 mass

0.6

239.078>

4-

**\***-

Lab Sample ID: 502105 Client Sample ID: F01009LS12

Matrix : SOIL

Sample Type : SAMPLE
Injection Date : 04-OCT-2002 02:55
Dilution Factor : 1.00
Data File Analyst : \tag{-1.i}
Instrument : 3327\_1.i
Column : RTX-5

Data File : 03oct021608-r051.d

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_1.i/100302\_1/03OCT021608.b/32CONG\_3327RTX5\_RAW.m

Reported : 17-Oct-2002 09:43 rrm

Peaks

Peak No.	Peak RT	Expected RT	Delta RT	Area	Height	Extract Conc. (ppb)	Flags	Peak Identification
					=======		=====	=======================================
1	0.958			53444	9921			
2	1.006			63139	10411			
3	1.210			376983	49564			
4	1.674			5549	866			
5	1.862			6101	980			
6	2.128			688	169			
7	2.245			1333	390			
8	2.328			3481	746	• •	9 5	
9	2.837			588	194			
10 11	2.922 3.099			133727 15276	35815 2340			
12	3.099			12759	1685			
13	3.407			5022	867			
14	3.584			4298	683			
15	3.768			13174	2930			
16	3.910			6964	1977			
17	3.977			5950	1731			
18	4.061			4572	990			
19	4.265			3405	839			
20	4.398			7962	2071			
21	4.620			503	154			
22	4.693			1769	588			
23	4.817			881	195			
24	4.999	5.001	-0.002	338869	134451	42.6618		Tetrachloro-meta-xylene
25	5.174			5489	855			
26	5.329			2272	475			
27	5.579			6171	1529			
28	5.805			451	131			
29	5.868			1078	272			
30	6.040			398	150			
31	6.331			661	134			
32	6.552			2966	948			
33	7.033			6908	2147			
34	7.397			883	293			
35	7.687			399	80			
36	7.767			2950	671		_	D##00
37	7.951	7.925	0.027	3571	1018	0.906880	а	BZ#28
38	8.082			2104	535			
39	8.312			373	117			
40	8.397			360 605	119			
41 42	8.477			605 2077	200 336			
43	8.545 9.255			3373	616			
44	9.255			699	152			
45	9.643			2206	497			
46	10.336			6294	1549			
47	11.604			2282	558			
48	11.788			660	184			
49	12.440			1 3,059	588			
50	13.335			495	110			
51	13.788	13.752	0.035	2759	246	2.59181	a	BZ#77
52	14.630			3815	779		-	<del>.</del> .
53	15.457			2305	429			
54	16.007			1896	202			
				30094		0029		

### STL Burlington - Target GC Injection Report

			_			Extract		
Peak	Peak	Expected	Delta			Conc.		
No.	RT	RT	RT	Area	Height	(ppb)	Flags	Peak Identification
=====		=======	======	=======	=======		=====	
56				2179	425			
57				2604	271			
58				2408	461			
59				762	151			
60				1026	159			
61				817	158			
62				1827	277			
63				520	105			
64				2810	299			
65				806	142			
\$ 66		22.559	-0.009	323086	63938	42.8286		BZ#198
67				2149	315			
68				1175	125			
69				924	168			
70				1668	221			
71				885	131			
72				1027	153			
73				2243	262			
74				1010	176			
75				764	130			
76				4557	824			
77				1182	191			
78				1835	271			
79				2438	129	•	2 9	
80				2326	396			
81				4186	564			
82				248	47			
83				362	85			
84				407	102			
85 86				293	72			
87				2267	378			
88				383	115			
89				554	103			
90				13775	3921			
91				1641	291			
92				2058	387			
93				2752	545			
93 94				10618	1444			
95				4472	674			
95 96				19235	2810			
96 97				5213	482	•		
98				4137	543			
99				2422	234			
100				861	162			
100				732	125			
101				413	91			
102				700	123			
103	39.078			492	81			

Flags: A - Peak quantitates above calibration range

U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

_	_		_
Target	- ი	mpor	inds

Peak	Expected	
RT	RT	Target Compound
*****		=======================================
4.999	5.001	Tetrachloro-meta-xylene
	5.761	BZ#8
	6.701	BZ#18
7.951	7.925	BZ#28
	8.984	BZ#52
	9.667	18Z#44 0000
	11.243	BZ#66 UU3U

a - Peak quantitates below reporting limit

H - User selected alternate compound hit

M - Peak manually integrated or manually identified

R - Peak fails recovery

STL Burlington - Target GC Injection Report

Peak RT	Expected RT	Target Compound
	12.207	BZ#101
13.788	13.752	BZ#77
	14.938	BZ#118
	15.993	BZ#153
	16.155	BZ#105
	17.328	BZ#138
	17.762	BZ#126
	18.647	BZ#128
	20.781	BZ#180
	22.271	BZ#170
22.550	22.559	BZ#198
	24.552	BZ#195
	27.655	BZ#206
	29.180	BZ#209

Matrix Analyst

SOIL

Instrument

3327\_2.i RTX-CLPII

Sample Type : Injection Date : Dilution Factor :

1.00

04-OCT-2002 02:55

SAMPLE

Data File

Falcon Compound Sublist: ENVNET /var/chem/3327\_2.i/100302\_1/030CT021608.b/32CONG\_3327RTXCLPII\_RAW.m 17-Oct-2002 09:54 rrm

Lab Sample

Ħ:

502105

Client Sample

ID:

F01009LS12

Reported Integrator Method Column

(1,051)					(1,255)		
54.636) 72.135)	. 1				,,		
<b>14:59</b> )							
(3,239)		h.*	(3,352)				
, ·							
(4,690) (5,965) (5,189)							
			<del></del>			Tetrachier	<del>- nets iylene (5,</del>
249) 18: £18)							
57,933) 5-(7,554)							
(7:814) HB:1973 HB:4524)							
(2).086)							
<del>\$79,1538</del> >							
(18.35) (18.43)							
至(4.7%) 三(11.386)							
(12.837)							
782#66 (13.012) T3.3.386)							
(14,049)							
						•	
D(15.410)							
<u>(1</u> 6.457)							
BZ#118 (17,082)							
(17.733) (17.982) (18.250)							
1/40 6071							
(19.196) W784388(19.691)							
\$26,1988 \$20,1988 \$20,1988							
(21.052) EZ0128 (21.464)							
(21,903)							
(22,455) (22,772) EZ#180 (23,082)							
1							
33:33), 224:330),		_				774400 404 477	
MZ#170 (24,980)					¥	BZ#198 (24.658)	
(725.840)							
<del>126:382</del> }							
(27,648)							
(28,409)							
(28,814) (29,089) (29,466)							
<del>1230.887</del> 2)							
138:927							
(31.833) (31.867)							
£332.3378)							
(32,878) (33,285) (33,576)							
(34,035)						: <del>•</del>	
(34,611) (35,108)							
5(35,527)						213	
136,384)			1/4	} ∢			
(37.224)							
<del>(3</del> 7:686)							
(39,412)					00	22	

Client Sample ID: F01009LS12 Lab Sample ID: 502105

Matrix : SOIL Sample Type : SAMPLE

Injection Date : 04-OCT-2002 02:55 : fw. : 3327\_2.i Analyst

Instrument Dilution Factor : 1.00

: 03oct021608-r051.d : RTX-CLPII Column Data File

Compound Sublist: ENVNET : Falcon Integrator

: /var/chem/3327\_2.i/100302\_1/03OCT021608.b/32CONG\_3327RTXCLPII\_RAW.m Method

Peaks

Reported : 17-Oct-2002 09:54 rrm

					Extract			
eak RT	Expected RT	Delta RT	Area	Height	Conc. (ppb)	Flags	Peak Identific	ation
		======	=======	=======	(PPD)	=====	2===2=================================	
1.051			160442	12294				
1.255			574517	79139				
1.736			1717	384				
1.831			4104	918				
2.135			3328	559				
2.456			3396	711				
2.627			1563	478				
2.729			3509	939				
3.239			5345	1321	*	47 (6)		
3.352			198996	51643				
3.762			3623	906				
3.835			2391	693				
3.921			6525	1883				
4.056			15780	3387				
4.176			3946	1355				
4.280			4543	857				
4.431			1255	425				
4.491			4189	721				
4.690			6963	2382				
4.965			460 479	156 114				
5.189 5.382	5.391	-0.009	466043	160169	42.5008		Tetrachloro-meta-xylene	
5.568	5.391	-0.009	5533	1015	42.5000		recracinoro-meta-xyrene	
5.777			2816	708				
5.912			915	289				
6.020			6288	1163	•	'		
6.249			5378	1550				
6.428			548	101				
6.610			523	133				
7.033			3210	973				
7.253			515	107				
7.554			7049	2226				
7.814			657	126				
8.013			569	146				
8.197			523	94				
8.459			632	178				
8.525			4432	1014				
8.680			1536	486				
9.086			2319	352				
9.450			1122	322				
9.538			7753	1311				
0.214			791	178				
10.296			2813	501				
10.494			2493	290				
L0.937			238	86				
11.026			6005	1564				
11.385			8961	1495				
12.214			363	87				
L2.320			2520	565				
L2.537			766	166	2 21255	_	D7#66	
L3.012	13.056	-0.044	3639	553	2.01376	a	BZ#66	
				1/8				
				- 748	0000			
13.386 14.049 15.410 16.457				2769 5677	2769 178	2769 178 5677 948	2769 178	2769 178

STL Burlington - Target GC Injection Report

_							Extract		
Pea		Peak	Expected	Delta			Conc.		
No		RT	RT	RT	Area	Height	(ppb)	Flags	Peak Identification
==:		=======	=======						
	56	17.082	17.075	0.007	327	71	1.04486	a	BZ#118
	57	17.733			2247	435			
	58	17.982			1635	239			0:
	59	18.250			2113	251			
	60	18.593			1217	113			
	61	19.196	10 712		37108	4340			
	62	19.691	19.713	-0.022	4199	491	0.483716	a	BZ#138
	63 64	19.768			3633	599			
		19.994			3685	613			
	65 66	20.198			2833	283			
	67	21.052 21.464	21.462	0.002	1125 953	154	1 04440		
	68	21.464	21.402	0.002	1775	143	1.04142	a	BZ#128
	69	22.455			1374	238 261			
	70	22.433			1591	201			
	71	23.082	23.115	-0.033	1189	247	0.552565	_	D2#100
	72	23.002	23.113	-0.033	812	146	0.552565	a	BZ#180
	73	24.133			391	96			
	74	24.308			4590	669			
\$	75	24.658	24.678	-0.020	521489	97727	41.0352		BZ#198
*	76	24.980	25.004	-0.024	3549	423	0.944999		BZ#170
	77	25.840	23.001	0.021	1246	184	0.744777	a	B2#170
	78	26.383			1701	322			
	79	26.542			583	125			
	80	27.648			998	92	•	W 25	
	81	28.409			8815	569			
	82	28.814			6255	449			
	83	29.089			1688	198			
	84	29.466			767	135			
	85	29.887			2193	313			
	86	30.071			4128	689			
	87	30.628			2244	94			
	88	30.747			1413	328			
	89	30.927			1871	285			
	90	31.472			4791	300			
	91	31.605			883	142			
	92	31.867			7707	911			
	93	32.277			9165	426			
	94	32.410			3759	903			
	95	32.878			59756	6730			
	96	33.285			8010	1059			
	97	33.576			13910	1230			
	98	34.035			9399	737			
	99	34.611			24329	2584			
	100	35.108			2155	309			
	101	35.527			7427	1252			
	102	36.384			1307	188			
	103	37.224			2491	315			
	104	37.694			653	125			
	105	37.858			904	151			
-	106	39.412			1150	174			

Flags: A - Peak quantitates above calibration range

R - Peak fails recovery
U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

Target	Compounds

Peak RT	Expected RT	Target Compound
	=======	
5.382	5.391	Tetrachloro-meta-xylene
	6.592	BZ#8
	7.698	BZ#18 000 A
	9.137	BZ#28 UU34

a - Peak quantitates below reporting limit

H - User selected alternate compound hit

M - Peak manually integrated or manually identified

STL Burlington - Target GC Injection Report

Peak	Expected	
RT	RT	Target Compound
=======		
	10.341	BZ#52
	11.312	BZ#44
13.012	13.056	BZ#66
	13.914	BZ#101
	16.080	BZ#77
17.082	17.075	BZ#118
	17.995	BZ#153
	18.720	BZ#105
19.691	19.713	BZ#138
	20.225	BZ#126
21.464	21.462	BZ#128
23.082	23.115	BZ#180
24.658	24.678	BZ#198
24.980	25.004	B2#170
	27.203	BZ#195
	29.805	BZ#206
	30.754	BZ#209

#### FORM 1 OTHER ORGANICS ANALYSIS DATA SHEET

ENVNET SAMPLE NO.

F01009LS13

Lab Name: STL BURLINGTON

Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.:

SDG No.: 89891

Matrix: (soil/water) SOIL

Lab Sample ID: 502104

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: 030CT021608-R041

% Moisture: 25 decanted: (Y/N) N

Date Received: 09/25/02

Extraction: (SepF/Cont/Sonc) SOXH

Date Extracted: 09/26/02

Concentrated Extract Volume: 10 (mL)

Date Analyzed: 10/04/02

Injection Volume: 1.0(uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: \_\_\_

Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS:

CAS NO. COMPOUND

(ug/L or ug/Kg) UG/KG

	4 4		
34883-43-7BZ#8		2.2 U	·
37680-65-2BZ#18		2.2 U	
7012-37-5BZ#28		2.2 U	
41464-39-5BZ#44		2.2 U	
35693-99-3BZ#52		2.2 Ū	
32598-10-0BZ#66		2.2 U	
32598-13-3BZ#77		2.2 U	
37680-73-2BZ#101		2.2 U	1
32598-14-4BZ#105		2.2 U	
31508-00-6BZ#118		2.2 U	
57465-28-8BZ#126		2.2 U	
38380-07-3BZ#128		2.2 U	
35065-28-2BZ#138		2.2 U	
35065-27-1BZ#153		2.2 U	100
35065~30-6BZ#170		2.2 U	
35065-29-3BZ#180		2.2 U	
52663-68-0BZ#187		2.2 U	
52663-78-2BZ#195		2.2 U	
40186-72-9BZ#206		2.2 U	
2051-24-3BZ#209		2.2 U	i

			Y (x10^5)				
0-	)	2.5° 25 10 10 10 27 27 28 29	° .	- 1 · - 1		A COLOR	
μ.	(0,962) (0,947) (1,217)						
N-	64 962)						
- 6	<u> </u>		(2,926)				 
•	73.371/33 73.371/33 32.433 33.433 34.433						1883
Ø-	(F) (333) (F) (333) (F) (833)				Tetrachloro #	<del>icta xylena (5,44</del> 3)	Lab Mat: Ana Ins: Coli Int: Met] Rep
7	15:552} 17:038)						Matrix Analyst Instrume Column Integrat Method Reported
<b>6</b>	17.038) 17.339) 17.339) 17.339)						Matrix Analyst Instrument Column Integrator Method Reported
•	101,999) 201,207) 109,665)						i
16	10.339>						ID:
11 12	(11.609)						502104 SOIL 3327_1 RTX-5 Falcon /var/c 17-Oct
- 1	<u>12:442</u> 5						104 17_1 7_1 -5 con con
13 14	982#81 (13,327) (13,788)						502104 SOIL 3327_1.i RTX-5 Falcon Falcon /var/chem/3 17-Oct-2002
15	T14,634) \$281981(14,843) \$28114 (15,446)				· 8		32
16	(16,533)						7_1. 9:43
17 18	β(17.330)					ни1¢	1/1
19 2 1ime 2	87,126 (17,802) 118,166 118,418 118,755 119,152)					HultiChrom (	Sample Inject Diluti Data F Compour 100302_rm
E .	982#157 (20,192) 1720,453)					GC 03act021608,1041	t s tion fion Fil und
12-						)21608	Sample Type on Dat on Fact le id Subl
22 23	5(22,2/5)			BZ#198 (22,557)		1041	le ate cto cto CTO
3 24	(23,388)				= -		ID: r: r: 216
1 8	EE24:9833						
8	C25,693)						F010091 SAMPLE 04-OCT 1.00 03oct02 ENVNET ENVNET
26 27	: }						F01009LS13 SAMPLE 04-OCT-200 1.00 03oct02160 ENVNET 8.b/32CONG
7 28	5(27,651)						S13 2002 1608 ONG
100	128.332)					=	2 0 8-r
29 30	(29.595)						02:10 r041.d
31	(30,537)						o d
32	(31.408)						MPLE -OCT-2002 02:10 00 oct021608-r041.d VNET b/32CONG_3327RTX5_RAW.m
ដ	7(32,656).						₩.m
ų.	034,046)				••		
8							
8	*		1 4				
37	:		*				
岩	-						

3-

ф. ф. Lab Sample ID: 502104 Client Sample ID: F01009LS13

Matrix : SOIL Sample Type : SAMPLE

Analyst Injection Date : 04-OCT-2002 02:10

Instrument : 3327 1.i Dilution Factor: 1.00

: RTX-5 Column Data File : 03oct021608-r041.d

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_1.i/100302\_1/030CT021608.b/32CONG\_3327RTX5\_RAW.m Reported : 17-Oct-2002 09:43 rrm

					Pe	eaks		
						Extract		
Peak No.	Peak RT	Expected RT	Delta RT	3	1101-1-	Conc.	<b>7</b> 1	
NO.	T======	K1	KI	Area ======	Height	(ppb)	Flags	Peak Identification
1	0.862			224	210			=======================================
2	0.947			106629	9461			
3	1.217			108754	13505			
4	1.443			21676	2346			
5	1.862			1304	191			
6 7	2.252			2098	565			
8	2.926			2327 213788	540 53768			
9	3.272			4877	1193	* 14	\$ 0	
10	3.318			9911	1310			
11	3.571			4366	581			
12	3.773			12698	3059			
13	3.915			4915	1251			
14	3.977			4491	1233			
15	4.063			3774	713			
16 17	4.269			4101	619			
18	4.400 4.624			6359	1509			
19	4.624			871 2477	240 706			
20	4.817			1348	272			
\$ 21	5.003	5.001	0.002	341039	135102	42.8678		Tetrachloro-meta-xylene
22	5.176			5486	843	12.0070		recracinoro-meta-xyrene
23	5.333			3606	563			
24	5.584			6733	1567			
25	5.752			1104	224			
26	5.870			1523	310			
27	6.043			1038	210			
28	6.552			751	202			
29	6.714			551	102			
30 31	7.038 7.399			2448	696			
32	7.643			1467 214	329 77			
33	7.769			2544	642			
34	7.947			2348	553			
35	8.093			1661	221			
36	8.315			513	161			
37	8.403			798	249			
38	8.477			978	275			
39	8.601			1185	200			
40	8.989			885	161			
41	9.122			894	192			
42 43	9.257			4348	842			
44	9.665 10.339			1556	280			
45	11.247			2609 819	566 178			
46	11.609			470	114			
47	12.212			891	198			
48	12.442			1647	328			
49	13.327			1 2416	407			
50	13.788			2161	213			
51	14.634			1085	233			
52	14.843			1578	287			
53	14.951			2461	338			
54 56	15.446			2086	357			
55	16.009			4110	565	038		

			2	2			Extract			
Pea		Peak	Expected	Delta		8	Conc.			
No		RT	RT	RT	Area	Height	(ppb)	Flags		Peak Identification
===	== = 56	16.182		======	1353	327		=====	=======	
	57	16.299			27827	2444				
	5 <i>1</i>	17.330			3933	562				
	⊃8 59	17.802	17 760	0.040			1 07440	_	DG#106	
			17.762	0.040	1893	214	1.97440	a	BZ#126	
	60	18.021			2194	447				
	61 62	18.166			1599	323 402				
	62 63	18.418			1915 2362	402				
	64	18.655			2496	400				
		18.775				96				
	65	19.152			460					
	66	19.795			827	194				
	67	19.901			3052	456				
	68	20.192			2976	477				
	69	20.453			891	169				
	70	20.786			5267	770				
	71	21.881			5399	542				
	72	22.275			3365	646				
	73	22.557	22.559	-0.002	324358	63211	42.3228		BZ#198	
	74	23.025			2317	343				
	75	23.388			1690	292				
	76	23.825			3496	647				
	77	24.403			3700	715				
	78	24.550			3973	705				
	79	25.217			2228	248				
	80	25.693			919	155		*		
	81	27.651			4711	843				
	82	27.888			601	109				
	83	28.342			2899	524				
	84	28.531			272	46				
	85	29.176			4429	909				
	86	29.595			1331	20				
	87	29.856			1122	178				
	88	30.537			6246	499				
	89	31.149			3887	85				
	90	31.408			593	79				
	91	31.634			258	65				
	92	31.758			2144	259				
	93	32.235			19617	4901				
	94	32.656			7261	765				
	95	32.800			7990	1390				
	96	33.048			6247	613				
	97	33.512			17980	2972				
	98	34.046			1252	195				
	99	34.706			1902	271				
1	00	35.280			2873	241				

Flags: A - Peak quantitates above calibration range

a - Peak quantitates below reporting limit

U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

Target	Compounds

Peak RT	Expected RT	Target Compound
	100000000000000000000000000000000000000	
5.003	5.001	Tetrachloro-meta-xylene
	5.761	BZ#8
	6.701	BZ#18
	7.925	BZ#28
	8.984	BZ#52
	9.667	BZ#44
	11.243	BZ#66
	12.207	BZ#101
	13.752	<sup>8Z#77</sup> ○○○○
	14.938	BZ#118 UU39

H - User selected alternate compound hit
M - Peak manually integrated or manually identified

R - Peak fails recovery

STL Burlington - Target GC Injection Report

Peak	Expected	
RT	RT	Target Compound
=======	======	
	15.993	BZ#153
	16.155	BZ#105
	17.328	BZ#138
17.802	17.762	BZ#126
	18.647	BZ#128
	20.781	BZ#180
	22.271	BZ#170
22.557	22.559	BZ#198
	24.552	BZ#195
	27.655	BZ#206
	29.180	BZ#209

1 .

		Y (xi0^5)	٦	
0.3-		0. 0. 0. 0. 0. 1. 1. 1. 1. 1. 6. 0. 6. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.		
1	(0.989) (1.266)			
2 VIETINE	(1,605) 1,842) 2,144) 2,472)			
~:f=	3,252)	(3,363)		
4 2000	\$ 455.55 \$1,255.5 \$1,255.5 \$1,276.5 \$1,			
12	5.786)	Tetreshlere neta nylene (5.79)	, ¤ăHOHÞā	Ħ
6 7	(6,029) (6,258) \$,619) 7,040)		Matrix Analyst Instrument Column Integrator Method Reported	Lab S
	7,040) 7,368) 7,363) 7,863)		rst nume nume nume nume nume nume nume nume	Sample
9 10	9.452) 3.751) 7.867 (9.130) 9.775)		nt	le ID:
: 8	10,785)			
11	99. <del>755)</del> -(11,394)		SOIL 3327 RTX Falc /var 17-0	502
12-	12,334)		SOIL 3327_2.i RTX-CLPII Falcon /var/chem 17-Oct-20	502104
<u>ن</u>	72#66 (13.034) 73.406)		LPI n che t-2	47
	23.918)		02	
15	<u>(15,419)</u>	· · · · · · ·	3327	
6	EZ#77 (16.117) C16.465)		5 5 5	
	7261181 (17.086)		4 1	
18	<u> </u>		ETM CO CO CO CO CO CO CO CO CO CO CO CO CO	C
15-	(18.733)		Sample Ty Injection Dilution Dilution Data File Compound 100302_1/0 Tm	Client
[ime 2	(19,216) (19,216) (19,217) (19,711) (120,208) (120,308)			ht
			Sample Ty Injection Dilution Data File Compound 00302_1/0 m	ຮູ
1	C21.067) EZ8128 (21.462) (21.914)		Sample Type Injection Date Dilution Factor Data File Compound Sublis 00302_1/030CT02 m	Sample
- 0	5(22,468) 102,7872) 102,180 (23,107)		Type: n Date: Factor: e : C Sublist: 030CT0216	e ID:
2	124:372)			FO.
84-	58Z#170 (24.997)		SAMPLE 04-OCT 1.00 03oct0 ENVNET 8.b/32	010
8	(25,928) 5(26,407)		SAMPLE 04-OCT-2002 1.00 03oct021608 ENVNET 08.b/32CONG_	1009LS13
27	28Z#195 (27.192) (27.640)		2002 1608 ONG_	SI
28-	(27,963) (28,435)		13 8 2	
29	(28,848) (23,103) (23,473)		002 02:10 608-r041.d NG_3327RTX	
8-	5(30.082)		10 1.d	
원	(30,9678) (31,488)		(CL)	
ਲ-	(31.880)		PII	
a-	(32,891)		אַן	
ų.	133,285 133,594 1234,108)	•	2 02:10 8-r041.d _3327RTXCLPII_RAW.m	
 జූ-	(34,624)		3	
8	(C35,145) >(35,540)		l	
36 37		≰		
38	(37,242)			
	20			
39		0041		
8-		0041		
#	<u> </u>			

Lab Sample ID: 502104 Client Sample ID: F01009LS13

Matrix Sample Type : SAMPLE : SOIL

natrix Analyst Injection Date : 04-OCT-2002 02:10

Instrument : 3327 2.i Dilution Factor: 1.00

Data File Column : RTX-CLPII : 03oct021608-r041.d

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_2.i/100302\_1/03OCT021608.b/32CONG\_3327RTXCLPII\_RAW.m Reported : 17-Oct-2002 09:54 rrm

					Pe	aks		
Peak No.	Peak RT	Expected RT	Delta RT	Area	Height	Extract Conc. (ppb)	Flags	Peak Identification
1	0.989			143291	11998	=======		***************************************
2	1.266			170589	20834			
3	1.605			26062	3137			
4	1.842			5230	975			
5	2.144			1318	269			
6	2.472			454	108			
7	2.638			1214	345			
8 9	2.742 3.252			5380	646	•-		
10	3.252			2009 310372	490 82593			
11	3.844			3168	808			
12	3.932			5754	1352			
13	4.065			15360	3778			
14	4.187			3728	1166			
15	4.294			4202	685			
16	4.440			1393	418			
17	4.500			2877	440			
18	4.699			4803	1581			
19	4.976			1600	222			
20	5.298	5 303	0.000	339	45			
\$ 21 22	5.391 5.577	5.391	0.000	461657	158924	42.1753		Tetrachloro-meta-xylene
22	5.785			3671 2000	856 565			
24	6.029			3518	933			
25	6.258			4284	1398			
26	6.435			429	122			
27	6.619			487	145			
28	7.040			714	213			
29	7.368			1497	172			
30	7.563			3244	722			
31	7.838			493	107			
32	8.459			1126	208			
33 34	8.556 8.791			2373	409			
35	8.977			1419 921	246 203			
36	9.130	9.137	-0.007	3055	330	1.26181	2	BZ#28
37	9.354	,,,,,,	0.007	926	201	1.20101	a	52#20
38	9.456			1244	346			
39	9.552			8221	1367			
40	9.775			993	197			
41	10.385			2242	315			
42	10.485			1514	251			
43	10.944			206	62			
44	11.035			1966	532			
45	11.394			13186	2101			
46 47	12.334 13.034	13.056	-0.022	354	92	1 00000	_	DG# CC
4.7	13.406	13.030	-0.022	2612 1252	402 168	1.92238	a	BZ#66
49	13.400			2350	395			
50	15.419			4601	631			
51	16.117	16.080	0.038	1037	148	2.66444	a	BZ#77
52	16.465			475	94			<b>.</b>
53	16.951			1735	298			
54	17.086	17.075	0.011	2651	370	1.22269	a	BZ#118
55	17.662			2210	385	1042		

STL Burlington - Target GC Injection Report

						Extract			
Peak	Peak	Expected	Delta			Conc.			
No.	RT	RT	RT	Area	Height	(ppb)	Flags		Peak Identification
=====							=====	========	
56	17.793			2732	401				
57	17.993			4394	621				
58	18.591			1471	144				
59	18.733	18.720	0.013	4199	503	3.01551	a	BZ#105	
60	19.216			33227	3663				
61	19.711	19.713	-0.002	9349	922	0.697323	a	BZ#138	
62	20.008			4090	645				
63	20.218			4520	709				
64	20.331			2636	421				
65	20.484			5342	679				
66	21.067			4368	621				
67	21.462	21.462	0.000	3553	602	1.24309	a	BZ#128	
68	21.914			1734	237				
69	22.468			4120	726				
70	22.787			669	166				
71	22.892			3875	596				
72	23.107	23.115	-0.009	3920	769	0.782295	a	BZ#180	
73	24.321			3133	512				
74	24.472			3662	617				
\$ 75	24.669	24.678	-0.009	522926	97958	41.1326		BZ#198	
76	24.997	25.004	-0.007	7302	1039	1.20570	a	BZ#170	
77	25.928			2265	293				
78	26.407			6043	982				
79	27.192	27.203	-0.011	4311	711	0.688035	, a	BZ#195	
80	27.640			3115	320				
81	27.963			7267	935				
82	28.435			1303	78				
83	28.848			2008	153				
84	29.109			557	78				
85	29.264			596	107				
86	29.473			835	138				
87	29.803			6749	1272				
88	30.082			4092	575				
89	30.648			2039	172				
90	30.750			5648	1370				
91	30.967			2029	260				
92	31.488			2477	303				
93	31.880			6099	445				
94	32.306			5831	301				
95	32.428			2100	539	_			
96	32.891			38684	7523				
97	33.285			9365	919				
98	33.456			4859	806				
99	33.594			9106	935				
100	34.108			7809	587				
101	34.624			24703	3001				
102	35.145			2040	296				
103	35.540			8630	1170				
104	37.242			1605	199				

Flags: A - Peak quantitates above calibration range

Target Compounds

Peak	Expected	
RT	RT	Target Compound
	=======	
5.391	5.391	Tetrachloro-meta-xylene
	6.592	BZ#8
	7.698	BZ#18
9.130	9.137	BZ#28
	10.341	BZ#52 0013
	11.312	BZ#52 0043

a - Peak quantitates below reporting limit

H - User selected alternate compound hit

M - Peak manually integrated or manually identified

R - Peak fails recovery

U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

STL Burlington - Target GC Injection Report

Peak	Expected	
RT	RT	Target Compound
13.034	13.056	BZ#66
	13.914	BZ#101
16.117	16.080	BZ#77
17.086	17.075	BZ#118
	17.995	BZ#153
18.733	18.720	BZ#105
19.711	19.713	BZ#138
	20.225	BZ#126
21.462	21.462	BZ#128
23.107	23.115	BZ#180
24.669	24.678	BZ#198
24.997	25.004	BZ#170
27.192	27.203	BZ#195
	29.805	BZ#206
	30.754	BZ#209

# FORM 1 OTHER ORGANICS ANALYSIS DATA SHEET

ENVNET SAMPLE NO.

F01009LS21

Q

Lab Name: STL BURLINGTON Contract: 22000

COMPOUND

CAS NO.

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

Matrix: (soil/water) SOIL Lab Sample ID: 502109

Sample wt/vol: 30.0 (q/mL) G Lab File ID: 030CT021608-R091

% Moisture: 26 decanted: (Y/N) N Date Received: 09/25/02

Extraction: (SepF/Cont/Sonc) SOXH Date Extracted: 09/26/02

Concentrated Extract Volume: 10(mL) Date Analyzed: 10/04/02

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: \_\_\_ Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/KG

2.2 U 34883-43-7----BZ#8 2.2 U 37680-65-2----BZ#18 2.2 U 7012-37-5----BZ#28 2.2 U 41464-39-5----BZ#44 35693-99-3----BZ#52 2.2 U 2.2 U 32598-10-0----BZ#66 2.2 U 32598-13-3----BZ#77 2.2 U 37680-73-2----BZ#101 32598-14-4----BZ#105 2.2 U 2.2 U 31508-00-6----BZ#118 2.2 U 57465-28-8----BZ#126 2.2 U 38380-07-3----BZ#128 2.2 U 35065-28-2----BZ#138 2.2 U 35065-27-1----BZ#153 2.2 U 35065-30-6----BZ#170 2.2 U 35065-29-3----BZ#180 2.2 U 52663-68-0----BZ#187 2.2 U 52663-78-2----BZ#195 2.2 U 40186-72-9----BZ#206 2.2 U 2051-24-3----BZ#209

FORM I OTHER

-	14-	(1,157)	(0,891)						
	. 100								
		₹1.6657> ±2.325>							
	<b>ω</b> -	2.325) 2.744) 2.325)					1		
	-	73. 363 73. 363 73. 366) 73. 360) 73. 360) 74. 952)							
	OI-	(200)	<u> </u>	20		<b>.</b>			
		\$545); \$6,960)		H E II	3 V	Tetrachiero-neto-nyl	<del>ene (4,99</del> 6)	Z K H O H Z K	
	6 7	3.323 3.333 3.333						Matrix Analyst Instrume Column Integrat Method Reported	Lab s
	∞-	23.333 27.333 27.333 27.333 27.333 27.333 27.333 27.333				1 40 4 4 4 4	*****	Matrix Analyst Instrument Column Integrator Method Reported	Sample
	<b>9</b> -	7(9,248)						<u>й</u> Н	10.
	<b>6</b> -	645} 648; 648;359) 110,740)							ID:
								SC RII Fa	50
	15-	日1:465 日2:495 日2:495 区12:431)						SOIL  3327 1.i  RTX-5  Falcon /var/chem/3327  17-Oct-2002 09	502109
	ដ-	(12.823) (13.069)						1.:	9
Ì	2.5	(43: <b>9%</b> )						i em/ 200	
	16	5(14.637)				· () ()	Ì	W	1 1
	16	BZ#114 (15.455)						27	1 1
	5	(16,295) (16,778) (17,137)						14 44 14 14	1
	- 1	<u>⊅</u> (18.013)					HUH	/1 /1	
	- 8	(18.389) (18.897)					HultiChrom	Sample Inject Diluti Data F Compou '100302_:rm	Client
	19 20 (Hin)	(19,784)					8	ple ect uti uti pou pou	ent
	) 12-	T20.444) T20.775)					03oct021608,1091	Sample Type Injection Date Dilution Facto Data File Compound Subli 00302_1/030CTO	1 1
		<b>E</b> (21,464)					21608	ype Fa Su 330	Sample
	8-	(21.956)	· · · · · · · · · · · · · · · · · · ·		BZ#198 (22,548)		1601	Pe Date Factor Sublist 30CT021	le
4.	23-	>(23,373)						or 023	
	2.					•		60	ID: F
	24-							SAMPLE 04-OCT 1.00 03oct0 ENVNET 8.b/32	010
	26-	(25.942)						SAMPLE 04-OCT-2 1.00 03oct021 ENVNET 8.b/32CO	F01009LS21
	27							-2002 21608 20NG_:	S2
	28-	(27.892) (28:336)						02 (	
	23-	(29,156) (29,564) (29,856)						05:55 -r091.d	
	3-	(29,856)						55 1.d	
	31.	(31.17Z) E						2 05:55 8-r091.d _3327RTX5_RAW.m	
	32 3	132,228) 132,528)						AW.	
	33 34	(33,505) (33,505) (33,505)						3	
	* : 8	134.717)					Ì	8 I I I	
	ਰੋ: ਪੂ	(35.265) (135.668)					1=		
		(36,602) (37,072)		1 4					_
	37 38	137.861)							
	ω.								

0.9

1.0

1.12

1. 1.

1.5

0.8

137.861) [39:843]

**u**-

**6**-

Lab Sample ID: 502109 Client Sample ID: F01009LS21

: SOIL Matrix Sample Type : SAMPLE

W Analyst Injection Date : 04-OCT-2002 05:55

Instrument : 3327 1.i Dilution Factor: 1.00

Column : RTX-5 Data File : 03oct021608-r091.d

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_1.i/100302\_1/03OCT021608.b/32CONG\_3327RTX5\_RAW.m Reported : 17-Oct-2002 09:44 rrm

Peaks

						Extract			
Peak	Peak	Expected	Delta			Conc.			
No.	RT	RT	RT	Area	Height	(ppb)	Flags	Peak Identifica	
1	0.891		*******	240940	33121	=======			
2	1.157			137599	12623				
3	1.667			11214	1233				
4	1.860			2728	427				
5	2.325			592	156				
6	2.704			196	56				
7	2.786			258	58				
8	2.924			6618	1601	- 10	W		
9	3.083			2076	538				
10	3.316			4379	712				
11	3.580			1398	349				
12 13	3.768 4.050			8517 1087	2930 300				
14	4.216			479	184				
15	4.393			4565	1517				
16	4.624			483	217				
17	4.690			1422	510				
\$ 18	4.996	5.001	-0.005	343412	136350	43.2627		Tetrachloro-meta-xylene	
19	5.415			423	90			•	
20	5.577			4182	1347				
21	5.766			1745	590				
22	5.863			546	233				
23	5.916			2501	719				
24	6.329			225	64				
25	6.548			910	282	٠			
26	6.867			605	91				
27	7.031			2087	519				
28	7.393			1793	361				
29 30	7.690 7.763			433 2337	109 568				
31	7.763	7.925	0.016	1695	402	0.439858		BZ#28	
32	8.084	7.323	0.010	287	94	0.435636	a	82#26	
33	8.199			539	158				
34	8.310			453	125				
35	8.392			506	175				
36	8.470			3762	737				
37	8.805			382	92				
38	9.248			3194	563			(4)	
39	9.645			720	180				
40	9.858			362	86				
41	10.252			471	152				
42	10.327			1636	349				
43 44	10.740			2210	529				
44 45	11.465 11.600			492 718	138 175				
46	11.600			718 319	98				
47	12.008			378	99				
48	12.119			2704	338				
49	12.431			3400	616				
50	12.823			1654	196				
51	13.069			2644	332				
52	13.823			15389	825				
53	13.976			6216	667				
54	14.637			6668	645				
55	15.455			3110	<b>~</b> ≈357	0047			

STL Burlington - Target GC Injection Report

						Extract		
Peak	Peak	Expected	Delta			Conc.		
No.	RT	RT	RT	Area	Height	(ppb)	Flags	Peak Identification
			2222222	=======		========		=======================================
56	16.295			20055	1790			
57	16.778			2589	307			
58	17.137			3869	524			162
59	18.013			6016	716			
60	18.389			3343	145			
61	18.897			776	142			
62	19.784			694	140			
63	20.444			835	169			
64	20.775			1147	207			
65	21.464			6056	1229			
66	21.956			884	157			
\$ 67	22.548	22.559	-0.011	349184	68037	45.6804		BZ#198
68	23.373			13610	1956			
69	25.942			481	93			
70	27.892			454	89			
71	28.336			1439	250			
72	28.540			341	33			
73	29.156			2161	175			
74	29.564			2444	135			
75	29.856			1344	103			
76	30.535		13	580	101			
77	31.177			4847	208			
78	31.366			1755	129			
79	31.490			812	139	•	(c) (c)	
80	31.625			517	120			
81	31.736			209	54			
82	31.851			826	185			
83	31.993			230	47			
84	32.228			4850	720			
85	32.572			1184	245			
86	32.789			5893	770			
87	32.891			3197	562			
88	33.039			3419	594			
89	33.150			8112	880			
90 91	33.505			13911	1874			
91	34.037 34.123			1206	206			
92				1290	305			
94	34.717			2123	342			
94	35.265			2879	275			
95 96	35.498 35.660			832	239			
96 97				1657	231	•		
97	36.602			1088	223			
98	37.072			775	133			
100	37.861 38.843			798	149			
101				611	115			
101	39.071			923	173			

Flags: A - Peak quantitates above calibration range

- a Peak quantitates below reporting limit
  H User selected alternate compound hit
- M Peak manually integrated or manually identified
- R Peak fails recovery
- U User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

#### \_\_\_ Target Compounds

Peak	Expected	
RT	RT	Target Compound
=======		
4.996	5.001	Tetrachloro-meta-xylene
	5.761 6.701	BZ#8
	6.701	BZ#18
7.940	7.925	BZ#28
	8.984	BZ#52
	9.667	BZ#44
	11.243	BZ#66
	12.207	gz#101 0048
	13.752	BZ#77 UU40

STL Burlington - Target GC Injection Report

Peak	Expected		
RT	RT	Target Compound	
		=======================================	
	14.938	BZ#118	
	15.993	BZ#153	
	16.155	BZ#105	
	17.328	BZ#138	
	17.762	BZ#126	
	18.647	BZ#128	
	20.781	BZ#180	
	22.271	BZ#170	
22.548	22.559	BZ#198	
	24.552	BZ#195	
	27.655	BZ#206	
	29.180	BZ#209	

	N-	<del>3(1:853)</del>							2.5				
		7(1,813) 1(2,146) 1(2,720) 1(2,964) 1(2,964) 1(3,964) 1(3,964) 1(3,964) 1(4,963) 1(4,963)											
	ω-	(2.964) 73-2386)											
	1	H3.655)											
		138											
	OI-	53,963) H5,234)					T-1						1 1
	6-	(6,249) (6,504)					10070001010 1100	<del>nylene (5,394</del> )	ጁ	걸절대	ΩH	₽ ¤	Ę
l	1	(6,249) (6,504)							င်္ခ	4	7. St.	at	Lab
	4								keported	Integrator Method	Instrument Column	Matrix Analyst	က
		<b>8.8</b> 8							te	. С. д.	# E	St X	Sample
l	1	(08,173) (78,956)							Ω	, it	ē		[년
l	•-	<b>興:點</b>								ř	7		'n
		<del>7(9, 959)</del>											ij
l	16-	13:335) 118:3333							••				2
l	<b>#</b> -								H	<u> </u>	۳ω	ູນ	ر ا
		2(11:385)							7-	al Va	32 X	SOIL	02
1	<b>12</b> -	(12,318)							CC	Falcon /var/c	-07	L	0210
	۲ <u>۵</u> -	3523687713.0	10>						7-0ct-2002	Var/chem/	3327_2.i RTX-CLPII		9
		(13.391) 2(13.672)							20	Lea Lea	Ĕμ		1 1
		(14.200)							0,2	1/3	• •		1 1
	<b>G</b> -	(14.805) (15:184)					·- # 8			(4)			1 1
1	16,	7(15.412)							9	27_2			
		(16.430) (16.678)							5	י'ט			
	<b>5</b> -	32118 (17.	075)						<b>υ</b>	<u>.</u>			
	<b>16</b> -	(17.736) (17.968)						₹.	mxx	1			
		C18,598)						Hu1£1Chrom	3	Compound 100302_1/0	Dilution Data File	Sample Typ Injection	Client
1	19 2	(19,203)						9		тр 30	lu ta	m p	F.
3	Ŋ.	187#138 (19. 1728:285)	691)					S		20 0	H H	Ct Le	1 2 1
Hin	25-	(20,165)						300		1/ 1/	는 다	μ. Υ Ο	1 1
ľ	<b>P</b> -							03aat021608, [091		$\sim$	Œ	Type on D	Sampl
	8-	<del>122</del> :8943						å		Sublist 30CT021	Factor	Da Da	[편]
		(22,459)						91		Ä	ij	CT .	[ e
	23-	722,778) 1270180 (23,	,084)							2	ĸ	ro O	븅
	Ŋ.	F(24, 477)					•			اوّ <del>د</del> :			
1		<u> </u>		 		 	-BZ#198 (24,658)			8 E	o H	၀ ဖ	দ্য
	<b>8</b> -	۴					•			ENVNET 08.b/32CONG	1.00 03oct021	SAMPLE	01009LS21
l	26-	1								3 1	0 10	OL P	8
	8	(26,378)								T 20	2	1	JT6
	27	(26,966)								<b>Q</b> :	S)	20	S2
	28-	Z28.309>								G	0	02	-
								ļ		ω	4	0	
ı	3-	(28:817) (29:448)								27		<u></u>	
	<b>8</b> -	(30.076)								RT	ت	ហ	
	표-	(30,355) (30,535)								X I	Դ	1	
	- 6	C31.481								327RTXCLPII			
	Ά-	(31.880 (31.880						İ		Ĭ			
	33-	1633.6							1	, '			
	ω-	<del>(33</del> :	381) 685)							₹ <u>A</u>			
	¥-	¢€34.	048)							RAW.m			i i
	<b>u</b> -	<b>2</b> 3:	3833) 1333)							3			
	*	138	<b>33</b>					155 232					
	<b>%</b> -	<u> </u>	156) 395)		1								
	37-	136:	3213										
1								1					

0.5

a-3-

8-<u>#</u>- (37,692) (38,102)

(39.417)

0.7-

• 8

1.0-

. . . . . . .

Lab Sample ID: 502109 Client Sample ID: F01009LS21

: SOIL Matrix

Sample Type : SAMPLE
Injection Date : 04-OCT-2002 05:55 Analyst Analyst : M Instrument : 3327\_2.i

Dilution Factor : 1.00

: 03oct021608-r091.d Column : RTX-CLPII Data File

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_2.i/100302\_1/03OCT021608.b/32CONG\_3327RTXCLPII\_RAW.m Reported : 17-Oct-2002 09:55 rrm

Peaks

						Extract			
Peak	Peak	Expected	Delta			Conc.			
No.	RT	RT	RT	Area	Height	(ppb)	Flags	Peak Identifica	
		=======		221240					
1 2	0.931			331248 192303	33886 17874				
3	1.237			6981	1140				
4	2.051			11513	1244				
5	1.813 2.146			2453	473				
6	2.454			1182	294				
7	2.720			1246	338				
8	2.964			1003	119				
9	3.239			3161	656	•			
10	3.358			8750	1637				
11	3.496			5222	906				
12	3.766			1822	525				
13	3.839			2098	504				
14	4.056			13053	3907				
15	4.256			2364	292				
16	4.436			1312	268				
17	4.693			6031	2033				
18	4.963			540	163				
19	5.234			790	164				
\$ 20	5.384	5.391	-0.007	465801	159467	42.3173		Tetrachloro-meta-xylene	
21	5.573			5000	1045			•	
22				791	199				
23	6.020			3812	925				
24	6.249			5142	1436				
25	6.504			3699	805				
26	6.858			262	96				
27	7.033			1657	351				
28	7,115			2254	741				
29	7.328			1646	227				
30	7.554			2438	549				
31	7.663			617	155				
32	7.814			1900	251				
33	8.173			726	119				
34	8.454			1006	212				
35	8.556			2945	431				
36				315	96				
37				688	144				
38				2671	464				
39				2901	814				
40				6904	1125				
41				1240	237				
42				1870	198				
43				2040	247				
44				369	. 77				
45				620	141				
46				1899	387				
47				2139	354				
48				8513	1288				
49				1393	236				
50				4420	680			DD1166	
51		13.056	-0.047	7168	769	2.14447	a	BZ#66	
52				6722	526				
53				17093	1479				
54				26690	753	O O E 4			
55	14.805			4441	7 490	0051			

STL Burlington - Target GC Injection Report

						Extract			
Peak	Peak	Expected	Delta			Conc.			
No.	RT	RT	RT	Area	Height	(ppb)	Flags	P	eak Identification
=====	=======	======	======		=======	=========	=====		=======================================
56	15.184			6335	646				
57	15.412			8491	727				
58	16.430			2333	305				
59	16.678			1170	181				
60	17.075	17.075	0.000	972	183	1.11147	a	BZ#118	
61	17.736			2651	340				
62	17.968			3690	346				
63	18.598			5757	328				
64	19.203			25123	2735				
65	19.691	19.713	-0.022	5141	387	0.432173	a	BZ#138	
66	19.997			3511	625				
67	20.165			3561	529				
68	20.575			3025	442				
69	21.901			668	151				
70	22.094			469	101				
71	22.459			1343	242				
72 73	22.778	03 115	0 031	423	91				
73 74	23.084 24.137	23.115	-0.031	1006	202	0.532761	a	BZ#180	
75	24.137			6118	1290				
\$ 76	24.508	24.678	-0.020	3179 556637	444	42 1001		771100	
77	26.378	24.070	-0.020	11385	102858 2084	43.1981		BZ#198	
78	26.966			919	88				
79	28.309			697	89				
80	28.817			711	67	•	25 81		
81	29.052			1050	163				
82	29.278			520	58				
83	29.446			908	153				
84	30.076			3190	282				
85	30.355			404	100				
86	30.625			3063	226				
87	30.745			2112	348				
88	31.481			10365	293				
89	31.880			5743	285				
90	32.281			5998	292				
91	32.410			893	267				
92	32.880			17290	1334				
93	33.064			11286	841				
94	33.381			10793	771				
95	33.605			3983	603				
96	34.048			4778	537	•			
97	34.509			2955	399				
98	34.613			9866	1431				
99	34.813			4266	412				
100	35.123			1887	279				
101	35.287			3273	384				
102	35.398			2921	506				
103	35.529			4005	604				
104	36.156			2108	201				
105	36.395			1492	210				
106	36.721			657	167				
107	36.812			1860	258				
108	37.692			1966	323				
109	38.102			971	163				
110	39.417			3444	293				

Flags: A - Peak quantitates above calibration range

a - Peak quantitates below reporting limit

H - User selected alternate compound hit

M - Peak manually integrated or manually identified

R - Peak fails recovery

U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

### STL Burlington - Target GC Injection Report

Expected

25.004

29.805

27.203 BZ#195 29.805 BZ#206 30.754 BZ#209

Peak

RT Target Compound RT ------======= \_ Target Compounds \_ Expected Peak Target Compound RT RT ====== ====== 5.391 Tetrachloro-meta-xylene 5.384 6.592 BZ#8 7.698 BZ#18 BZ#28 9.137 10.341 BZ#52 11.312 BZ#44 13.056 BZ#66 13.010 13.056 BZ#101 13.914 16.080 BZ#77 17.075 BZ#118 17.995 BZ#153 17.075 18.720 BZ#105 19.713 BZ#138 20.225 BZ#126 19.691 20.225 21.462 BZ#128 23.115 BZ#180 23.084 24.678 BZ#198 24.658 BZ#170

1 4

#### FORM 1 OTHER ORGANICS ANALYSIS DATA SHEET

ENVNET SAMPLE NO.

F01009LS22

Lab Name: STL BURLINGTON

Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.:

SDG No.: 89891

Matrix: (soil/water) SOIL

Lab Sample ID: 502108

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: 030CT021608-R081

% Moisture: 24 decanted: (Y/N) N Date Received: 09/25/02

Extraction: (SepF/Cont/Sonc) SOXH

Date Extracted: 09/26/02

Concentrated Extract Volume: 10 (mL)

Date Analyzed: 10/04/02

Injection Volume: 1.0(uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: \_\_\_

Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS:

CAS NO. COMPOUND

(ug/L or ug/Kg) UG/KG

······································	
34883-43-7BZ#8 37680-65-2BZ#18 7012-37-5BZ#28	2.2 U 2.2 U 2.2 U 2.2 U
41464-39-5BZ#44 35693-99-3BZ#52 32598-10-0BZ#66	2.2 U 2.2 U 2.2 U 2.2 U
32598-13-3BZ#77 37680-73-2BZ#101 32598-14-4BZ#105 31508-00-6BZ#118	2.2 U 2.2 U 2.2 U
57465-28-8BZ#118 38380-07-3BZ#128 35065-28-2BZ#138	2.2 U 2.2 U 2.2 U 2.2 U 2.2 U
35065-27-1BZ#153 35065-30-6BZ#170 35065-29-3BZ#180	2.2 U 2.2 U 2.2 U
52663-68-0BZ#187 52663-78-2BZ#195 40186-72-9BZ#206 2051-24-3BZ#209	2.2 U 2.2 U 2.2 U 2.2 U 2.2 U

	(4,882 · · · · · · · · · · · · · · · · · ·	<b>&gt;</b>
23-	(1,204) (2,2323)	¥7
<b>ω</b> -	72,926) (2,917)	=1
	\$1.542\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	
	= (0,167) (1,1	Matr Anal Inst Colu Inte Meth Repo
8-	55, 55, 55, 55, 55, 55, 55, 55, 55, 55,	ix yst rument mn grator od rted
- 8	173,638) 1730,149) ≤170,389)	i i i i i i i i i i i i i i i i i i i
11 12	11.482) 112.6429) 112.870)	SOIL 3327_1.i RTX-5 Falcon /var/chem/3 17-Oct-2002
ω.	)(13.872)	.i
15	S(14.621)	ι ω
	(36,000) >(16,273)	27_1.09:44
17 18	T17.303)  \$\overline{\text{T24126}}\$ (17.758)  \$\overline{\text{518}}\$,008)	Sampl Injec Dilut Data Compoi 1/100302
19 2		
20 21 20 21	(20.440) (20.768)	tion in File bund in Santa San
22	T21.464) T21.947)	ple Dat Dat act COCT
23 24		0
25 26	\$24,394) \$74,699) \$25,250) \$25,667)	F01009LS  SAMPLE 04-OCT-2 1.00 03oct021 ENVNET 08.b/32CO
6 27		9152 T-20 0216 T
28 29	153:833 153:8335 153:835	02 0 08-x 06_33
3- 3-	(29,586) (29,839) (20,131) >(30,521) (30,991)	05:10 r081.d 327RTX5
31 32 33 34	(31.32) (31.32) (31.32) (31.32) (31.32) (31.32) (31.32) (31.32)	RAW.m
35 36	5(34,689)	
37 3	(37,473) [(37,867)	

Y (x10^5)

1.0

0.4

39

**\$**-

Lab Sample ID: 502108 Client Sample ID: F01009LS22

: SOIL Matrix Analyst Sample Type : SAMPLE

Injection Date : 04-OCT-2002 05:10

Instrument : 3327\_1.i Dilution Factor: 1.00

Column : RTX-5
Integrator : Falcon : 03oct021608-r081.d Data File

Compound Sublist: ENVNET

Method : /var/chem/3327\_1.i/100302\_1/030CT021608.b/32CONG\_3327RTX5\_RAW.m Reported : 17-Oct-2002 09:44 rrm

					Pe	eaks		
Peak	Peak	Expected	Delta			Extract Conc.		
No.	RT	RT	RT	Area	Height	(ppb)	Flags	Peak Identification
=====		=======	=======			=======	=====	
1	0.882			2351684	400639			
2	1.204			283543	36654			
3	1.538			19542	2906			
4	1.667			10139	1926			
5 6	1.771			11938	1258			
7	2.075 2.237			2612	325			
8	2.323			4432 10788	1179			
9	2.826			823	1991 261	•	xi - s:	
10	2.917			194736	56717			
11	3.088			19817	3356			
12	3.265			17417	2547			
13	3.405			7631	1427			
14	3.582			6094	1131			
15	3.764			9970	2334			
16	3.899			3977	849			
17	3.979			7476	1731			
18	4.119			1013	325			
19	4.205			1798	252			
20	4.327			1319	412			
21	4.393			4279	1243			
22	4.560			1310	250			
23	4.688			2253	657			
\$ 24	4.994	5.001	-0.007	348115	137953	43.7700		Tetrachloro-meta-xylene
25	5.167			15207	3411			
26	5.398			2133	253			
27 28	5.577			4930	1464			
26 29	5.863			1208	373			
30	6.036 6.351			476	153			
31	6.541			1494 4835	521 1063			
32	6.694			902	289			
33	7.029			5039	1467			
34	7.251			227	85			
35	7.393			1186	322			
36	7.623			594	145			
37	7.761			4849	971			
38	7.945	7.925	0.020	2951	803	0.743877	a	BZ#28
39	8.082			1947	364			
40	8.308			1150	357			
41	8.395			777	274			
42	8.470			1406	477			
43	8.545			1425	326			
44	8.975			416	144			
45	9.248			2633	503			
46	9.638			1822	413			
47	10.119			3350	398			
48	10.330			6775	1425			
49	10.469			8174	2281			
50	11.482			851	192			
51 52	11.595			2687	610			
52 53	11.786			879	207			
53 54	12.001 12.429			1104	220			
55	12.429			3882	- 687 101 (	ነስፎር		
23	12.870			478	101	056		

### STL Burlington - Target GC Injection Report

						Extract			
Peak	Peak	Expected	Delta			Conc.			
No.	RT	RT	RT	Area	Height	(ppb)	Flags		Peak Identification
====		=======			=======			=======	
56	13.872			15870	915				
57	14.621			6041	1229				
58	16.000			1718	170				
59	16.273			23327	2461				
60	17.303			1570	177				
61	17.758	17.762	-0.004	1242	211	1.97003	a	BZ#126	
62	18.008			3189	519				
63	19.782			913	180				
64	20.440			836	174				
65	20.768			2059	250				
66	21.464			1275	265				
67	21.947			888	164				
\$ 68	22.546	22.559	-0.013	344694	67186	45.0883		BZ#198	
69	23.211			1209	254				
70	23.370			446	95				
71	23.514			533	99				
72	24.394			684	119				
73	24.649			958	163				
74	25.250			3194	267				
75	25.667			1305	191				
76	27.892			1263	215				
77	28.061			1049	187				
78	28.336			5926	1120				
79	28.493			957	163				
80	28.845			910	125	****			
81	29.021			1662	280				
82	29.586			3228	150				
83	29.839			7009	698				
84	30.131			2787	199				
85	30.521			11852	1098				
86	30.991			1771	102				
87	31.322			647	63				
88	31.494			600	98				
89	31.627			571	134				
90	31.734			6864	841				
91	32.091			908	189				
92	32.224			8518	2224				
93	32.501			1985	352				
94	32.567			1625	403				
95	32.789			10297	1294				
96	33.006			2843	551				
97	33.144			3941	586				
98	33.387			2264	474				
99	33.503			14869	2563				
100	33.815			1991	263				
101	34.689			6354	1022				
102	35.269			3534	401				
103	35.746			1362	218				
104	37.473			760	122				
105	37.867			1387	189				

Flags: A - Peak quantitates above calibration range

U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

Target (	Compounds
----------	-----------

Peak RT	Expected RT	Target Compound
=======		=======================================
4.994	5.001	Tetrachloro-meta-xylene
	5.761	BZ#8
	6.701	BZ#18
7.945	7.925	BZ#28 00 F 7
	8.984	BZ#52 [][][][]

a - Peak quantitates below reporting limit

H - User selected alternate compound hit

M - Peak manually integrated or manually identified

R - Peak fails recovery

STL Burlington - Target GC Injection Report

Peak	Expected	
RT	RT	Target Compound
=======	=======	
	9.667	BZ#44
	11.243	BZ#66
	12.207	BZ#101
	13.752	BZ#77
	14.938	BZ#118
	15.993	BZ#153
	16.155	BZ#105
	17.328	BZ#138
17.758	17.762	BZ#126
	18.647	BZ#128
	20.781	BZ#180
	22.271	BZ#170
22.546	22.559	BZ#198
	24.552	BZ#195
	27.655	BZ#206
	29.180	BZ#209

.

<u></u>		246)	(0.1	148)		
3	(501, 800)					
10-	\$(2.141) \$2.432)					
<b>u</b> -	(3,232)					
8	₩(3,755)	(3,345)			•	
•	(2000) (2000) (2000) (2000) (2000) (2000)				Г	
OI-						
1	5.185/ 5.185/		Tetrashlara neta nylena (5,	175>	RAHOHPR	ьI
0	○(6,009) ○(6,244)				Matrix Analyst Instrument Column Integrator Method Reported	Lab
7						- 1
- 1	(7,322) >(7,548)				T OF THE WAY	a l
					ed at me	Sampl
					or nt	le
9	(*** 082)					
5-	<del>图</del> 9·386) <b>阿纳纳</b>					H H
16				İ		- 1
1	54.531), F11.536)				SOIL 3327 RTX-( Falco /var, 17-0	50.
					SOIL S327 TX- TAlc Var Var	0210
93	12.314) 12.314)				SOIL 3327_2 RTX-CL Falcon /var/c 17-Oct	80
<u>ا</u> لم	(12,023) (12,334) (12,334) (13,335) (13,375)				SOIL 3327_2.i RTX-CLPII Falcon /var/chem 17-Oct-20	
					SOIL 327_2.i 327_2.i 2TX-CLPII valcon var/chem/3	
1 :	(14,054) (14,364)				NIN	
15	<b>⊳</b> (15,401)				327 09	- 1
16				-		
•	(16.450)				ຫ <sup>ັ</sup> ນ	- 1
15	₹16.862>				μ.	
15	<u>(17.966)</u>			E	LTM DO DD DI	
	(£18,593)		a	Č.	n O	
19 20 Time (Hin)	(19.183)			ģ	Sample Typ Injection Dilution F Data File Compound S 100302_1/03	Client
# 22	     			8	20 Fitte	유
Hin.	123:294)			3oct	le Ty ction tion l file File ound : 2_1/0:	ഗ
12	(721.036)			HultiChrom GC 03oct021608,1081	Type on Don Facile 1d Sul	Sample
22	MZ#128 (21,448) [21,901)			. 8	pe : Date : Factor : Sublist: 30CT0216	ַב <u></u>
N	5(22,446)			82	HOLL TO	n
23	(22,763) BZ#180 (23,078)				22.5	ij
l N	0				60	υļ
, Ž.	F21:5683		BZ#198 (24,652)		80 80 80 80	ᅜ
2			20000		SAMPLE 04-OCT 1.00 03oct0 ENVNET 18.b/32	유
,,	(25.829)				/3 NE CCT OCT PI	8
26-	725.029) 726.088) E8:842)				Sample Type : SAMPLE Injection Date : 04-OCT-2 Dilution Factor : 1.00 Data File : 03oct021 Compound Sublist: ENVNET 100302_1/030CT021608.b/32COrm	F01009LS
27					-20 216	S2
	(727,961)				002 608-	22
28	<u>(</u> 28,398)				8 - 1	
3.	(28.854) (29.087)				05:10 r081.d	
	1729.440) 1729.870) 1730.065)				)5:10 :081.	
8	(30.065)				X d	
<u>بر</u>					<u>β</u> [	
	b(31.860)			-	05:10 -r081.d 3327RTXCLPII_RAW.m	
32	(32,226)				,H	
ដ	(32,873)				'אַ	
	(1535, 800) (1535, 800)		••		ΑW	1
34	34.2743				ä	
34 35 36	\$35.929\ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\				-	
	(25; 263) (5:35, 520)					
36	136,380)	1 4				
ម	i.	• •				
"	5(37.213)					

9

38 39

**\$**-

(39.434)

Client Sample ID: F01009LS22 Lab Sample ID: 502108

Matrix : SOIL Sample Type : SAMPLE
Analyst : Injection Date : 04-OCT-2002 05:10
Instrument : 3327\_2.i Dilution Factor : 1.00
Column : RTX-CLPII Data File : 03oct021608-r081.d
Integrator : Falcon Compound Sublist: ENVNET
Method : /var/chem/3327\_2.i/100302\_1/03OCT021608.b/32CONG\_3327RTXCLPII\_RAW.m
Reported : 17-Oct-2002 09:55 rrm

					Pe	eaks		
						Extract		
Peak	Peak	Expected	Delta			Conc.		
No.	RT ======	RT	RT	Area	Height	(ppb)	Flags	Peak Identification
1	0.918			3063497	405875		====	=======================================
2	1.246			437423	54981			
3	1.800			9026	1264			
4	2.141			11035	2060			
5	2.438			4067	943			
6	2.620			4206	1295			
7	2.724			9983	2474			
8	3.232			10666 295643	2742	•-	. 9	
9 10	3.345 3.755			10187	82564 1818			
11	3.755			4120	946			
12	4.050			10692	2877			
13	4.172			2312	748			
14	4.285			3116	485			
15	4.420			2308	567			
16	4.529			4884	1290			
17	4.686			3705	1275			
18	4.854			1129	284			
19 20	4.956			1289	212			
20	5.185 5.375	5.391	-0.016	439 476750	138 162961	43.2306		Totworkless make and an
22	5.566	3.371	-0.010	3835	968	43.2306		Tetrachloro-meta-xylene
23	5.730			4935	1210			
24	6.009			14616	2242			F4
25	6.244			6431	1675			
26	6.530			1640	577			
27	6.606			995	260			
28	6.728			2488	883			
29	6.947			907	315			
≘30 31	7.027			1708	636			
32	7.322 7.548			731 5404	156 1550			
33	7.803			2058	310			
34	8.437			872	162			
35	8.523			3239	640			
36	8.676			580	219			
37	8.774			1338	290			
38	8.958			946	254			
39	9.082			2834	414			
40	9.348			2131	501			
41 42	9.439 9.541			3691 8304	898			
43	9.756			1746	1386 273			
44	10.203			864	208		••	
45	10.290			1201	363			
46	10.374			2894	583			
47	10.839			389	91			
48	10.924			712	162			
49	11.019			5885	1415			
50	11.234			1858	314			
51	11.378			7863	1239			
52 53	12.023			789	206			
53 54	12.314 12.533			2312 331	604 110	0000		

# STL Burlington - Target GC Injection Report

						Extract				
eak No.	Peak RT	Expected RT	Delta RT	Area	Height	Conc. (ppb)	Flags	-	Peak Identif	ication
	K1	=======	======		_	=======	=====	=======		
56	12.866			15549	4012					
57	13.001			4228	679				2	
58	13.375			911	149					
59	14.054			3580	257					
60	14.364			1600	194					
61	15.401			6897	1306 116					
62	16.450			656	575					
63	16.862			6989	250					
64	17.966			2045	140					
65	18.593			1603 29318	3663					
66	19.183			4562	406	0.44159	0 a	BZ#138		
67	19.680	19.713	-0.033	3262	584					
68	19.988			1710	229					
69	20.194			727	107					
70	21.036		-0.013	404	78	1.01286	a	BZ#128		
71	21.448	21.462	-0.013	827	170					
72	21.901			4125	548					
73	22.446			1281	169					
74	22.763	23.115	-0.038	1034	221	0.54112	23 a	BZ#180		
75	23.078	23.115	-0.030	1269	288					
76	24.128			2831	442					
77 78	24.304	24.678	-0.027	544902	101366	42.5692	2	BZ#198		
78	24.652	24.070	0.027	689	107	-9				
79	25.829 26.088			1462	272					
80	26.374			573	125					
81	26.542			367	84					
82 83	27.961			2152	203					
84	28.398			1796	186					
85	28.854			3780	334					
86	29.087			1654	201					
87	29.440			1731	329					
88	29.870			1588	204					
89	30.065			8909	1399					
90	30.48			746	149					
91	30.60			518	112					
92	30.73			961	243					
93	30.91			1929	291					
94	31.51	4		2239	76					
95	31.60	7		590	208		(é •			
96	31.86	0		3507						
97	32.22	6		4731						
98				4655 2130						
99					2424					
100				20264 4424						
101				8259						
102				15680						
103				6031						
104				3687						
105				3581						
106				1753						
10				139						
10				279	-					
10				576						
11				154		4				
11				717		8				
11				66		0				
11				231		3	- T-			
11	4 39.4	J4								

Flags: A - Peak quantitates above calibration range

Reported: 10/17/2002 09:55 rrm

-- 0061

a - Peak quantitates below reporting limit

H - User selected alternate compound hit
M - Peak manually integrated or manually identified

R - Peak fails recovery U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

## STL Burlington - Target GC Injection Report

Peak	Expected	ì		
RT	RT		Target	Compound
		=====		=======================================
		Target	Compounds	

Peak	Expected	
RT	RT	Target Compound
	******	
5.375	5.391	Tetrachloro-meta-xylene
	6.592	BZ#8
	7.698	BZ#18
	9.137	BZ#28
	10.341	BZ#52
	11.312	BZ#44
	13.056	BZ#66
	13.914	BZ#101
	16.080	BZ#77
	17.075	BZ#118
	17.995	BZ#153
	18.720	BZ#105
19.680	19.713	BZ#138
	20.225	BZ#126
21.448	21.462	BZ#128
23.078	23.115	BZ#180
24.652	24.678	BZ#198
	25.004	BZ#170
	27.203	BZ#195
	29.805	BZ#206 % 8
	30.754	BZ#209

# FORM 1 OTHER ORGANICS ANALYSIS DATA SHEET

ENVNET SAMPLE NO.

F01009LS23

Lab Name: STL BURLINGTON Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

Matrix: (soil/water) SOIL Lab Sample ID: 502107

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 030CT021608-R071

% Moisture: 25 decanted: (Y/N) N Date Received: 09/25/02

Extraction: (SepF/Cont/Sonc) SOXH Date Extracted: 09/26/02

Concentrated Extract Volume: 10(mL) Date Analyzed: 10/04/02

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: \_\_\_ Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG 2.2 U 34883-43-7----BZ#8 37680-65-2----BZ#18 2.2 U 7012-37-5----BZ#28 2.2 U 41464-39-5----BZ#44 2.2 U 2.2 U 35693-99-3----BZ#52 2.2 U 32598-10-0----BZ#66 2.2 U 32598-13-3----BZ#77 2.2 0 37680-73-2----BZ#101 32598-14-4----BZ#105 2.2 U 2.2 U 31508-00-6----BZ#118 2.2 U 57465-28-8----BZ#126 2.2 U 38380-07-3----BZ#128 2.2 U 35065-28-2----BZ#138 2.2 U 35065-27-1----BZ#153 35065-30-6----BZ#170 2.2 U 2.2 U 35065-29-3----BZ#180 2.2 U 52663-68-0----BZ#187 52663-78-2----BZ#195 2.2 U 40186-72-9----BZ#206 2.2 U 2051-24-3----BZ#209 2.2 U

FORM I OTHER

.

	(0,896)				
<b>≤(1:598)</b>	(1,213)				
23.9483 (18.00)					
(2.851 (3.1692)				(2,926)	
(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)			(4,305)		
	(4,615)		(4,300)	Tetrschloro ne	to mylene (5.
	₹(\$\\$\\$)				
	(6,3	57> BZ#18 {6.519}			
	1398363 (23 18 28 (7.936)	(7,031)			
	(28 (7,936)		×		
	269 6892) 19 26 452 (9,031)				
	(10,	219)(	10.307>		(10,
EL: (8)					
₹12.6885 ≥₹12.4350					
(32.934)					
23.8Z),					
<b>(14,630)</b>				•- 10 13	
(16,011)					
117.319>					
BZ#126 (17.72 (18.017)	<b>()</b>				
(18,631)					
1518.631) 1519.790)					
(20,449)					
121.471)					
(21,956)					
			BZ#198 (22,555)		
(23,377)				•	
(24,399) (24,656)					
(25,274) (25,669)					
\$26,199>					
(27.648) (27.898) (28.872)					
728.5849) 729.036)					
(29,615) >(29,843)					
(30,526)					
(30.880)					
132:1954)					
(32,521) (32,521) (32,798)					
795	12)				
(34,691	<b>&gt;</b>				
(35.274)					
(35,677)					
		•			
		1			
£38,976)			į.		

×1				
Method Reported	Integrator	Analyst Instrument	Matrix	Lab Sample ID: 502107
				:
/var/chem/3327_1.i/100302_1/030CT021608.b/32CONG_3327RTX5_ 17-Oct-2002 09:43 rrm	Falcon Co	1.1.	SOIL Sa	
302	ta mpc	jec lut	I of tu	ier
1,1	Data File Compound :	tion	e	) †t
030	.e L Sul	n D	Sample Type	amp
CT02	olis	ate		le I
160	Ċ			Ü
08.b/32CONG_3327RTX5_RAW.m	Data File : 03oct021608-r071.d Compound Sublist: ENVNET	Injection Date : 04-OCT-2002 04:25 Dilution Factor : 1.00	SAMPLE	Client Sample ID: F01009LS23

Client Sample ID: F01009LS23 Lab Sample ID: 502107

: SAMPLE Sample Type Matrix : SOIL

Analyst Analyst : Instrument : 3327\_1.i Column : RTX-5 Injection Date : 04-OCT-2002 04:25

Dilution Factor: 1.00

Data File : 03oct021608-r071.d

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_1.i/100302\_1/03OCT021608.b/32CONG\_3327RTX5\_RAW.m

Reported : 17-Oct-2002 09:43 rrm

Peaks

Reported: 10/17/2002 09:43 rrm

						Extract			
Peak	Peak	Expected	Delta			Conc.			
No.	RT	RT	RT	Area	Height	(ppb)	Flags	Peak Identification	
=====			=======	120040	25222	========			
1 2	0.896 1.009			128940 81142	25777 16121				
3	1.213			303044	27284				
4	1.585			35422	4886				
5	1.698			47107	4974				
6	2.048			9466	1244				
7	2.243			6220	1438				
8	2.330			12179	2085	•	\$1 × 0		
9	2.556			1510	459				
10	2.627			4142	486				
11	2.851			21775	7352				
12	2.926			318004	85200				
13	3.165			12157 27803	3080 3844				
14 15	3.274 3.476			27803	686				
16	3.582			5152	860				
17	3.766			18535	4091				
18	3.835			10524	1758				
19	3.992			9529	2335				
20	4.152			2219299	888063				
21	4.305			353152	68304				
22	4.520			62150	11424				
23	4.615	2		101505	22398				
24	4.733	200		24858	4913				
25	4.879	5 001		32931	6106 143078	45.3919		Tetrachloro-meta-xylene	
\$ 26 27	5.001	5.001	0.000	376936 14119	3830	45.3919		Teclachiolo-meda-xylche	
28	5.174 5.271			23480	3168				
29	5.513			27769	5110				
30	5.584			14211	3864				
31				30861	4972				
32				2689	993				
33	5.879			11063	2357				
34	5.963			4678	1493				
35				18773	6205				
36				12760	3305				
37				21525	4537				
38				65941	21684 39713				
39			-0.004	133202 144454	34501	42.5438		BZ#18	
40 41			-0.004	2998839	953297	42.5450		22420	
42				91821	26513				
43				2220	787				
44				12066	3858				
45				14996	3815				
46				39048	6258				
47		1		29589	6355				
48				31297	7748				
49				63689	7902			D. T. I. O. O.	
50			0.011		6308	4.91751	a	BZ#28	
51				9829	2463				
52				15424	2331 896				
53				2150 12489					
54 55				22766	~4565	0000			
55	0.5/4	•		22.30	1333	0065			

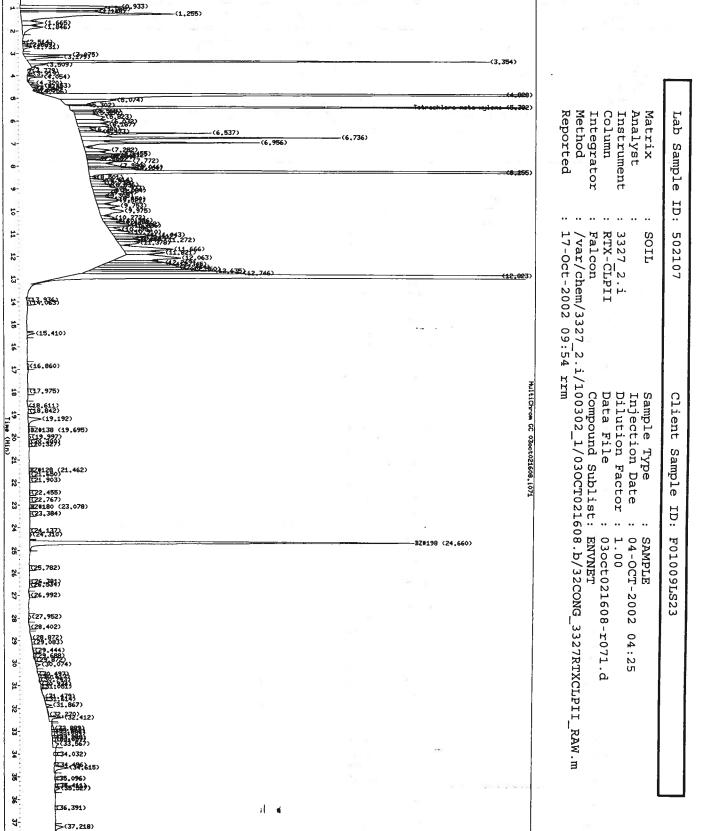
						Extract		
Peak No.	Peak RT	Expected RT	Delta RT	Area	Height	Conc. (ppb)	Flags	Donk Idontification
====	******		222222	ALCO	nergiic		=====	Peak Identification
56	8.802			31548	3963			
57	8.880	0.004	0.047	11591	3048			
58 59	9.031 9.150	8.984	0.047	58563 17503	8042 3921			BZ#52
60	9.257			23783	3959			
61	9.359			23806	5146			
62	9.463			41943	5982			
63	9.614			45394	7778			
64 65	9.736 9.877			72305 40869	8026 7831			
66	9.959			24693	7118			
67	10.046			47055	10421			
68	10.101			41900	11076			
69 70	10.219 10.307			121920 289783	23761 50310			
71	10.432			6251072	958434		М	
72	11.491			3228	545			
73	11.602			3719	580			
74 75	11.793 12.008			1541	243			
76	12.435			2163 5217	<b>446</b> 960			
77	12.877			291	71			
78	12.994			1186	277			
79	13.677			200	30	•	e: 5:	
80 81	13.867 14.630			2836 9039	404			
82	16.011			1614	1922 149			
83	16.277			21563	2372			
84	17.319			1036	148			
85 86	17.720	17.762	-0.042	1022	201	1.95545	a	BZ#126
86	18.017 18.631			1972 1251	431 232			
88	19.790			711	156			
89	20.449			934	183			
90	20.783			2016	229			
91 92	21.471 21.956			430	94			
\$ 93	22.555	22.559	-0.004	2206 347259	240 67959	45.6261		BZ#198
94	23.377			2562	344	13.0201		BB#170
95	23.749			1660	162			
96 97	24.399 24.656			3131	508	•		
98	25.274			1286 3703	215 341			
99	25.669			1130	153			
100	26.199			504	99			
101	27.648			1075	158			
102 103	27.888 28.072			1142 988	202 180			
104	28.340			5500	1032			
105	28.504			471	92			
106	29.036			846	149			
107 108	29.615 29.843			2649 7716	47			
109	30.526			18992	1189 3046			
110	30.880			464	75			
111	31.326			271	23			
112	31.505			309	72			
113 114	31.636 31.734			391 6813	96 879			
115	32.104			1061	231			
116	32.241			2277	316			22
117	32.521			4366	378			
118 119	32.798 33.110			13876 <b>4</b> 975	1648 571			
120	33.110			4975	709			
121	33.396			2325	541			
122	33.512			25194	4328			
123	34.691 35.274			16272	2508			
124 125	35.274 35.677			2982 1907	337 226			
126	38.976			306	î î î î î î	0066		

Flags: A - Peak quantitates above calibration range

- a Peak quantitates below reporting limitH User selected alternate compound hit
- M Peak manually integrated or manually identified
- R Peak fails recovery
- U User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

\_\_\_ Target Compounds

Peak	Expected	
RT	RT	Target Compound
=======	======	
5.001	5.001	Tetrachloro-meta-xylene
	5.761	BZ#8
6.697	6.701	BZ#18
7.936	7.925	BZ#28
9.031	8.984	BZ#52
	9.667	BZ#44
	11.243	BZ#66
	12.207	BZ#101
	13.752	BZ#77
	14.938	BZ#118
	15.993	BZ#153
	16.155	BZ#105
	17.328	BZ#138
17.720	17.762	BZ#126
	18.647	BZ#128
	20.781	BZ#180
	22.271	BZ#170
22.555	22.559	BZ#198
	24.552	BZ#195
	27.655	BZ#206
	29.180	BZ#209



0068

38 39

40 41

(39,018)

(39,528)

1.0

1,3-

Lab Sample ID: 502107 Client Sample ID: F01009LS23

Matrix : SOIL Sample Type : SAMPLE

Analyst : Injection Date : 04-OCT-2002 04:25

Instrument : 3327\_2.i Dilution Factor : 1.00

Column : RTX-CLPII Data File : 03oct021608-r071.d

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_2.i/100302\_1/030CT021608.b/32CONG\_3327RTXCLPII\_RAW.m

Reported : 17-Oct-2002 09:54 rrm

						Extract				
Peak	Peak	Expected	Delta			Conc.		ya. A		
No.	RŤ	RT	RT	Area	Height	(ppb)	Flags		tification	
1	0.933		=======	169882	26865		====			:==:
2	1.055			117147	20865					
3	1.148			74761	20685					
4	1.255			390860	40861					
5	1.665			45428	5679					
6	1.846			50955	5536					
7	2.514			2317	719					
8	2.629			5393	1426					
9	2.731			11453	2408	•	2			
10	3.075			43731	12624					
11	3.179			44417	10034					
12	3.354			402073	123053					
13	3.509			16085	4001					
14 15	3.779			3953	865					
16	3.919 4.054			3119 14565	1194					
17	4.320			5979	4170 1658					
18	4.453			9082	3303					
19	4.560			2485	803					
20	4.624			728	365					
21	4.706			3013	1276					
22	4.828			2915386	963747					
23	5.074			140981	14767					
24	5.302			16168	5570					
25	5.382	5.391	-0.009	556035	173787	46.0604.		Tetrachloro-meta-xy	lene	
26	5.568			25089	5750					
27	5.650			32342	5730					
28	5.823			97264	7945					
29	6.032			72204	9003					
30	6.167			68757	8317					
31	6.380			22920	3899					
32	6.473			22040	6072					
33	6.537			150456	35040					
34 35	6.736 6.956			265009	68904					
36	7.282			175085 48678	46968					
37	7.455			48605	6889 10107					
38	7.512			29169	8998		М			
39	7.512			22386	6927		M			
40	7.599			19976	6027		M			
41	7.665			9748	3437		M			
42	7.772			59160	11941					
43	7.980			55136	8267					
44	8.046			50405	12788					
45	8.104			45307	12584					
46	8.255			3731890	951719					
47	8.501			6680	1710			The second		
48	8.614			20204	4147					
49	8.738			27823	4163					
50	8.836			28126	5403					
51	8.977			56224	6916					
52	9.084			45231	6920		M			
53	9.164			25409	4264		M			
54	9.308			14252	3083					
55	9.450			38287	~ 6 <b>1</b> 59	0069				

56 9.521 44349 5926	k Identification
56 9.521 44349 5926	= #
57 9.753 41140 5844	
58 9.975 80585 6528	
59 10.272 21063 3487 60 10.396 27165 5041	
61 10.478 12643 3603	
62 10.562 32354 6274	
63 10.636 28054 6329	
64 10.795 17659 3151 65 10.910 34965 5154	
66 11.043 52638 10926	
67 11.112 35622 8401	
68 11.201 16421 5212 69 11.272 11.312 -0.040 34818 6444 3.28002 a BZ#44	
69 11.272 11.312 -0.040 34818 6444 3.28002 a BZ#44 70 11.378 38308 5591	
71 11.666 119266 13455	
72 11.821 77309 10522	
73 12.063 188439 16711 M 74 12.269 83909 15340 M	
75 12.345 106158 19322 M	
76 12.464 122994 21917 M	
77 12.560 141531 26145 M	
78 12.635 141117 33822 M 79 12.746 269044 43011 M	
79 12.746 269044 43011 M 80 12.823 7401147 956303 M	
81 13.936 520 62	
82 14.063 1217 304	
83 15.410 9824 2091 84 16.860 4966 395	
85 17.975 1270 190	
86 18.611 886 36	
87 18.842 617 136	
88 19.192 27341 3466 89 19.695 19.713 -0.018 4143 356 0.416810 a BZ#138	
89 19.695 19.713 -0.018 4143 356 0.416810 a BZ#138 90 19.997 3394 615	
91 20.200 1533 219	
92 20.327 1295 230	
93 21.462 21.462 0.000 507 91 1.01858 a BZ#128 94 21.650 1777 236	
95 21.903 1155 204	
96 22.455 1492 265	
97 22.767 1179 161	
98 23.078 23.115 -0.038 1064 210 0.536282 a BZ#180 99 23.384 1221 183	
100 24.137 426 101	
101 24.310 3372 522	
\$ 102 24.660 24.678 -0.018 552387 103250 43.3633 BZ#198	
103 25.782 608 71 104 26.381 1160 257	
105 26.534 708 130	
106 26.992 2066 227	
107 27.952 5493 665	
108     28.402     1670     203       109     28.872     2586     258	
110 29.083 1211 193	
111 29.444 1595 288	
112 29.688 813 173	
113 29.872 1799 177 114 30.074 6335 1286	
115 30.497 400 32	
116 30.617 412 101	
117 30.743 1091 264	
118 30.934 841 39 119 31.051 248 74	
120 31.479 2173 174	
121 31.614 441 139	
122 31.867 7072 1610	
123 32.270 3971 222 124 32.412 19691 3968	
125 32.889 126 33.008 5974 7648 0070	
126 33.008 3763 687 UU ( U	

						Extract		
Peak	Peak	Expected	Delta			Conc.		
No.	RT	RT	RT	Area	Height	(ppb)	Flags	Peak Identification
====	=======	=======		=======		========	====	*=====================================
127	33.084			6689	740			
128	33.288			4640	754			
129	33.359			6160	802			
130	33.567			18086	1684			
131	34.032			4193	619			
132	34.496			3759	529			
133	34.615			26405	3951			
134	35.096			959	197			
135	35.411			1754	290			
136	35.527			8024	1445			
137	36.391			795	113			
138	37.218			15914	2154			
139	39.018			566	105			
140	39.528			2639	277			

Flags: A - Peak quantitates above calibration range

a - Peak quantitates below reporting limit

H - User selected alternate compound hit
M - Peak manually integrated or manually identified

R - Peak fails recovery

U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

Target Compounds

Peak	Expected	
RT	RT	Target Compound
=======		
5.382	5.391	Tetrachloro-meta-xylene
	6.592	BZ#8
	7.698	BZ#18
	9.137	BZ#28
	10.341	BZ#52
11.272	11.312	BZ#44
	13.056	BZ#66
	13.914	BZ#101
	16.080	BZ#77
	17.075	BZ#118
	17.995	BZ#153
	18.720	BZ#105
19.695	19.713	BZ#138
	20.225	BZ#126
21.462	21.462	BZ#128
23.078	23.115	BZ#180
24.660	24.678	BZ#198
	25.004	BZ#170
	27.203	BZ#195
	29.805	BZ#206
	30.754	BZ#209

### FORM 1 OTHER ORGANICS ANALYSIS DATA SHEET

ENVNET SAMPLE NO.

F01009LS31

Lab Name: STL BURLINGTON

Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.:

SDG No.: 89891

Matrix: (soil/water) SOIL

Lab Sample ID: 502112

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 030CT021608-R151

% Moisture: 25 decanted: (Y/N) N Date Received: 09/25/02

Extraction: (SepF/Cont/Sonc) SOXH

Date Extracted: 09/26/02

Concentrated Extract Volume: 10 (mL)

Date Analyzed: 10/04/02

Injection Volume: 1.0(uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: \_\_\_

Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS:

CAS NO. COMPOUND	(ug/L or ug/Kg) UG/KG	Q

34883-43-7BZ#8	2.2 U
37680-65-2BZ#18	2.2 U
7012-37-5BZ#28	2.2 U
41464-39-5BZ#44	
35693-99-3BZ#52	2.2 U
32598-10-0BZ#66	2.2 U
32598-13-3BZ#77	2.2 U
37680-73-2BZ#101	2.2 U
32598-14-4BZ#105	2.2 U
31508-00-6BZ#118	2.2 U
57465-28-8BZ#126	2.2 U
38380-07-3BZ#128	2.2 U
35065-28-2BZ#138	2.2 U
35065-27-1BZ#153	2.2 U
35065-30-6BZ#170	2.2 U
35065-29-3BZ#180	2.2 U
52663-68-0BZ#187	2.2 U
52663-78-2BZ#195	2.2 U
40186-72-9BZ#206	2.2 U
2051-24-3BZ#209	2.2 U

(0.896) *(1.153)				
:863} :336}				
2, 326) 1, 318) 1, 556) 1, 569, 7773) 1, 698, 7773) 1, 698, 773 1, 698, 779) 1, 698, 779)				- [
5,280) (5,579) 1,883)		Tetrachiero meta-	Hylene (1:999)	Mat: Ana Ins Col: Int Met! Rep
<b>₹:5</b> 28}				Matrix Analyst Instrument Column Integrator Method Reported
7,031) 7,395) 7,361)-, 947)				ix Yst cum nn gra od ot
7,781/7,947) 17,947) 18,879)			П	ent
9,248) 9,640)				', ',
10.168) 10.158)				
11.589)				SOIL 3327 RTX- Falc /var 17-0
(12,431)				SOIL 3327_1.i RTX-5 Falcon /var/chem/ 17-Oct-200
			ļ	
<del>13,75</del> 813.777)				
314,623)		• 8	İ	332
12#114 (15,455) (16,007) >(16,281)				9:
S-(16,778)				144
717,301)			¥	/1 rr
(18,239)			HultiChrom	Sampl Injec Injec Dilut Data Compo 100302
(19,130) (19,779)			8	
(20,442)			03oct	e Tynition ition ition file File und i
(20,770) (21,464)			021608	Type on D. Type D. Ta Fa. 1e 1d Sul./030
(21.943) (22.269)	BZ#198 <2	22 546)	03oct021608.i151	pe Date Factor Sublis 30CT02
>(23,366)		2.510/	=	Type: Sion Date: 0 on Factor: 1 ile: 0 on Sublist: E1/030CT021608
		. de	=:	6
(24.643)				· Ζω· 4 Þ
(25,931)				OCT OCT OCT OCT OCT OCT OCT OCT OCT OCT
1 2 2				2 CO
(727,640) (727,908)				SAMPLE 04-OCT-2002 1.00 03oct021608 ENVNET 8.b/32CONG_
<del>{{28</del> :334}				10 - 10 - 23 - 23 - 23 - 23
(29,154) (29,555) (29,845)			i	10:25 r151.d
5730 528)				TX5
131.260) 131.260) 131.260) 131.500)				MPLE -OCT-2002 10:25 00 oct021608-r151.d VNET b/32CONG_3327RTX5_RAW.m
(32,226) (32,226)				W.
(33.5%)				3
534,709) (35,258) (38,638)				
136,200)				•
<b>3.33</b>	1 ◀			

~~~0073

(38:832) (39:860)

39

**6**-

Lab Sample ID: 502112 Client Sample ID: F01009LS31

Matrix : SOIL Sample Type : SAMPLE

Injection Date : 04-OCT-2002 10:25 Analyst

Instrument : 3327\_1.i Dilution Factor: 1.00

: RTX-5 Column Data File : 03oct021608-r151.d

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_1.i/100302\_1/03OCT021608.b/32CONG\_3327RTX5\_RAW.m Reported : 17-Oct-2002\_09:44\_rrm

| Peak<br>No. | Peak<br>RT       | Expected<br>RT | Delta<br>RT | Area           | Height        | Extract<br>Conc.<br>(ppb) | Flags  |                         |
|-------------|------------------|----------------|-------------|----------------|---------------|---------------------------|--------|-------------------------|
| 1           | 0.896            | *******        | ****        | 65548          | 7928          | ========                  | =====  |                         |
| 2           | 1.153            |                |             | 21051          | 2614          |                           |        |                         |
| 3           | 1.667            |                |             | 451            | 97            |                           |        |                         |
| 4           | 1.869            |                |             | 1107           | 246           |                           |        |                         |
| 5           | 2.110            |                |             | 673            | 142           |                           |        |                         |
| 6<br>7      | 2.330            |                |             | 1048           | 193           |                           |        |                         |
| 8           | 2.926<br>3.119   |                |             | 3716<br>6460   | 792           |                           |        |                         |
| 9           | 3.318            |                |             | 4648           | 1159<br>723   | _                         | 92 16  |                         |
| 10          | 3.556            |                |             | 1226           | 296           |                           | *0 (0) |                         |
| 11          | 3.773            |                |             | 13395          | 4493          |                           |        |                         |
| 12          | 3.908            |                |             | 2787           | 333           |                           |        |                         |
| 13          | 4.059            |                |             | 631            | 153           |                           |        |                         |
| 14          | 4.303            |                |             | 765            | 153           |                           |        |                         |
| 15          | 4.398            |                |             | 6782           | 2384          |                           |        |                         |
| 16          | 4.695            |                |             | 3128           | 974           |                           |        |                         |
| 17<br>18    | 4.917<br>4.999   | 5.001          | -0.002      | 373            | 79            | 45 0150                   |        |                         |
| 19          | 5.280            | 5.001          | -0.002      | 362771<br>3587 | 144422<br>406 | 45.8173                   |        | Tetrachloro-meta-xylene |
| 20          | 5.579            |                |             | 4837           | 1531          |                           |        |                         |
| 21          | 5.805            |                |             | 408            | 122           |                           |        |                         |
| 22          | 5.865            |                |             | 1577           | 387           |                           |        |                         |
| 23          | 6.038            |                |             | 662            | 202           |                           |        |                         |
| 24          | 6.184            |                |             | 627            | 164           |                           |        |                         |
| 25          | 6.548            |                |             | 1234           | 313           | 7.5                       |        |                         |
| 26          | 6.725            |                |             | 384            | 89            |                           |        |                         |
| 27<br>28    | 7.031<br>7.395   |                |             | 2746           | 698           |                           |        |                         |
| 29          | 7.761            |                |             | 1901<br>4494   | 260<br>782    |                           |        |                         |
| 30          | 7.947            | 7.925          | 0.022       | 2280           | 762<br>549    | 0.551306                  | 2      | BZ#28                   |
| 31          | 8.086            |                |             | 1138           | 196           | 0.551500                  | •      | 52#20                   |
| 32          | 8.315            |                |             | 282            | 117           |                           |        |                         |
| 33          | 8.474            |                |             | 5383           | 1299          |                           |        |                         |
| 34          | 8.607            |                |             | 2210           | 359           |                           |        |                         |
| 35          | 9.248            |                |             | 4342           | 759           |                           |        |                         |
| 36<br>37    | 9.640            |                |             | 1798           | 230           |                           |        |                         |
| 38          | 10.168<br>10.330 |                |             | 639            | 136           |                           |        |                         |
| 39          | 11.589           |                |             | 2718<br>1738   | 510<br>324    |                           |        |                         |
| 40          | 12.431           |                |             | 3651           | 691           |                           |        |                         |
| 41          | 13.652           |                |             | 906            | 205           |                           |        |                         |
| 42          | 13.777           | 13.752         | 0.024       | 2260           | 234           | 2.57236                   | a      | BZ#77                   |
| 43          | 14.623           |                |             | 3935           | 740           |                           |        |                         |
| 44          | 15.455           |                |             | 532            | 112           |                           |        |                         |
| 45          | 16.007           |                |             | 996            | 130           |                           |        |                         |
| 46          | 16.281           |                |             | 25235          | 2441          |                           |        |                         |
| 47<br>48    | 16.778           |                |             | 12916          | 2179          |                           |        |                         |
| 48<br>49    | 17.301<br>18.010 |                |             | 2743<br>2348   | 294           |                           |        |                         |
| 50          | 18.239           |                |             | 202            | 444<br>54     |                           |        |                         |
| 51          | 19.130           |                |             | 984            | 176           |                           |        |                         |
| 52          | 19.779           |                |             | 1174           | 235           |                           |        |                         |
| 53          | 20.442           |                |             | 932            | 179           |                           |        |                         |
| 54          | 20.770           |                |             | 1611           | 240           |                           |        |                         |
| 55          | 21.464           |                |             | 507            | 248<br>104    | 0074                      |        |                         |

|    |     |        |          |        |        |        | Extract |       |                     |
|----|-----|--------|----------|--------|--------|--------|---------|-------|---------------------|
| P  | eak | Peak   | Expected | Delta  |        |        | Conc.   |       |                     |
| 1  | No. | RT     | RT       | RT     | Area   | Height | (ppb)   | Flags | Peak Identification |
| =  |     |        |          |        | ====== |        |         | ===== |                     |
|    | 56  | 21.943 |          |        | 2695   | 267    |         |       |                     |
|    | 57  | 22.269 |          |        | 818    | 121    |         |       |                     |
| \$ | 58  | 22.546 | 22.559   | -0.013 | 350221 | 68780  | 46.1973 |       | BZ#198              |
|    | 59  | 23.366 |          |        | 15746  | 2532   |         |       |                     |
|    | 60  | 24.643 |          |        | 935    | 158    |         |       |                     |
|    | 61  | 25.931 |          |        | 609    | 117    |         |       |                     |
|    | 62  | 27.640 |          |        | 3293   | 329    |         |       |                     |
|    | 63  | 27.908 |          |        | 1147   | 173    |         |       |                     |
|    | 64  | 28.331 |          |        | 2276   | 409    |         |       |                     |
|    | 65  | 28.509 |          |        | 755    | 140    |         |       |                     |
|    | 66  | 29.154 |          |        | 4138   | 331    |         |       |                     |
|    | 67  | 29.555 |          |        | 6454   | 341    |         |       |                     |
|    | 68  | 29.845 |          |        | 3567   | 317    |         |       |                     |
|    | 69  | 30.528 |          |        | 7365   | 733    |         |       |                     |
|    | 70  | 31.067 |          |        | 2351   | 40     |         |       |                     |
|    | 71  | 31.180 |          |        | 287    | 56     |         |       |                     |
|    | 72  | 31.486 |          |        | 511    | 112    |         |       |                     |
|    | 73  | 31.621 |          |        | 590    | 145    |         |       |                     |
|    | 74  | 31.749 |          |        | 1512   | 193    |         |       |                     |
|    | 75  | 31.982 |          |        | 376    | 105    |         |       |                     |
|    | 76  | 32.226 |          |        | 10923  | 2051   |         |       |                     |
|    | 77  | 32.379 |          |        | 1011   | 245    |         |       |                     |
|    | 78  | 32.485 |          |        | 1196   | 269    |         |       |                     |
|    | 79  | 32.605 |          |        | 1109   | 233    |         | 8 0   |                     |
|    | 80  | 32.705 |          |        | 2413   | 529    |         | 3.0   |                     |
|    | 81  | 32.785 |          |        | 3968   | 966    |         |       |                     |
|    | 82  | 32.895 |          |        | 2489   | 526    |         |       |                     |
|    | 83  | 33.026 |          |        | 3717   | 610    |         |       |                     |
|    | 84  | 33.146 |          |        | 4467   | 778    |         |       |                     |
|    | 85  | 33.292 |          |        | 7680   | 697    |         |       |                     |
|    | 86  | 33.505 |          |        | 15740  | 2352   |         |       |                     |
|    | 87  | 33.809 |          |        | 3206   | 346    |         |       |                     |
|    | 88  | 34.032 |          |        | 987    | 205    |         |       |                     |
|    | 89  | 34.117 |          |        | 1333   | 322    |         |       |                     |
|    | 90  | 34.199 |          |        | 1249   | 320    |         |       |                     |
|    | 91  | 34.709 |          |        | 4603   | 721    |         |       |                     |
|    | 92  | 35.258 |          |        | 4150   | 359    |         |       |                     |
|    | 93  | 35.493 |          |        | 2003   | 473    |         |       |                     |
|    | 94  | 35.635 |          |        | 2132   | 290    |         |       |                     |
|    | 95  | 36.200 |          |        | 644    | 125    |         |       |                     |
|    | 96  | 36.599 |          |        | 2293   | 400    | •       |       |                     |
|    | 97  | 36.741 |          |        | 1332   | 250    |         |       |                     |
|    | 98  | 36.879 |          |        | 1195   | 165    |         |       |                     |
|    | 99  | 37.065 |          |        | 1803   | 262    |         |       |                     |
|    | 100 | 37.384 |          |        | 282    | 84     |         |       |                     |
|    | 101 | 37.471 |          |        | 1022   | 175    |         |       |                     |
|    | 102 | 37.850 |          |        | 758    | 155    |         |       |                     |
|    | 103 | 38.036 |          |        | 554    | 73     |         |       |                     |
|    | 104 | 38.832 |          |        | 892    | 177    |         |       |                     |
|    | 105 | 39.060 |          |        | 1724   | 302    |         |       |                     |
|    |     |        |          |        |        |        |         |       |                     |

Flags: A - Peak quantitates above calibration range

U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

| Target C | Compounds |
|----------|-----------|
|----------|-----------|

| Peak<br>RT | Expected<br>RT | Target Compound         |
|------------|----------------|-------------------------|
|            |                |                         |
| 4.999      | 5.001          | Tetrachloro-meta-xylene |
|            | 5.761          | BZ#8                    |
|            | 6.701          | BZ#18                   |
| 7.947      | 7.925          | 8Z#28 007E              |
|            | 8.984          | BZ#52 UU/J              |

a - Peak quantitates below reporting limit

H - User selected alternate compound hit

M - Peak manually integrated or manually identified

R - Peak fails recovery

STL Burlington - Target GC Injection Report

| Peak    | Expected |                          |
|---------|----------|--------------------------|
| RT      | RT       | Target Compound          |
| ======= | =======  | ************************ |
|         | 9.667    | BZ#44                    |
|         | 11.243   | BZ#66                    |
|         | 12.207   | BZ#101                   |
| 13.777  | 13.752   | BZ#77                    |
|         | 14.938   | BZ#118                   |
|         | 15.993   | BZ#153                   |
|         | 16.155   | BZ#105                   |
|         | 17.328   | BZ#138                   |
|         | 17.762   | BZ#126                   |
|         | 18.647   | BZ#128                   |
|         | 20.781   | BZ#180                   |
|         | 22.271   | BZ#170                   |
| 22.546  | 22.559   | BZ#198                   |
|         | 24.552   | BZ#195                   |
|         | 27.655   | BZ#206                   |
|         | 29.180   | BZ#209                   |

| 0.3-                                    | Y (x10~5)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |                                    |            |            |                         |           |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|------------------------------------|------------|------------|-------------------------|-----------|
| 1                                       | <del>5(1,232)</del>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                  |                                    |            |            |                         |           |
| 2 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - | 1.782)  (1.782)  (1.782)  (1.782)  (1.782)  (1.782)  (1.782)  (1.782)  (1.782)  (1.782)  (1.782)  (1.782)  (1.782)  (1.782)  (1.782)  (1.782)  (1.782)  (1.782)  (1.782)  (1.782)  (1.782)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |                                    |            |            |                         |           |
| 6                                       | 75, 75, 75, 75, 75, 75, 75, 75, 75, 75,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  | Method<br>Report                   | Integra    | Inst       | Matrix<br>Analyst       | Lab       |
| 2 8 9                                   | 7, 927)<br>7, 923)<br>7, 923)<br>9, 243)<br>9, 253)<br>9, 323)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  | Method<br>Reported                 | Integrator | Instrument | yst<br>Yst              | Sample ID |
| 6                                       | H8: <del>378</del> }                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |                                    | <br>He b   |            |                         | D: 5      |
|                                         | (4.998)<br>(11.768)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                  | /var/chem/3<br>17-Oct-2002         | Falcon     | 3327_2.1   | TIOS                    | 0211      |
| 1                                       | <u>rt</u> 2,311)<br><u>r</u> 13,003)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  | /che                               | On C       | i : .      |                         | 12        |
|                                         | <u>ra</u> 3.392)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  | em/3<br>2002                       | F          | 4 P-       |                         |           |
| :                                       | X35,047)<br>X15,401)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  | /var/chem/3327_<br>L7-Oct-2002 09: |            |            |                         |           |
| 16 17                                   | (36,450)<br>(36,716)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  | .56<br>:56                         |            |            |                         |           |
| (0)                                     | #17,638)<br>#137,964)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | HU161            | /1<br>rr                           | ဂ္ဂ ဌ      | ם כ        | ΗÑ                      | Ω         |
| 19                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | HultiChrom G     | 100302                             | Compound   | Dilution   | Sample Typ<br>Injection | Client    |
|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | GC 030c          |                                    | ounc       | tion l     | le ]                    |           |
| S 22-                                   | \$25<br>\$25912899(21.448)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 03oct021608.i151 | _1/03OCT021608                     | T St       | )<br>Fig.  | Type<br>on D            | Sample    |
| 13-                                     | 721 (844)<br>722 (444)<br>729 (75)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1161             | CTO                                | Sublist    | Factor     | pe<br>Date              | )le       |
| 23-                                     | 722.765)<br>EZ#180 (23.073)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                  | 216                                | ις<br>(†   |            |                         | : dI      |
| 24                                      | 724,1173)<br>1724,1793)<br>1724,1793)<br>1724,1793)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                  | •                                  | 7          | э.<br>Н    | SA<br>04                | FO        |
| 25                                      | <u>√</u> 25.829>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  | b/3                                | ENVNET     | 00         | SAMPLE<br>04-OCT-       | 100       |
| 6 27                                    | <b>(26,367)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                  | 2C0                                | VNET       | 31         |                         | 1009LS31  |
| 28                                      | \(\frac{\text{\chi}}{\chi^27.643}\) \(\frac{\chi^27.990}{\chi}\)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  | ୍ଷ                                 | 0          | 809        | 2002                    | 31        |
| 3-                                      | (28,469)<br>(28,810)<br>(728,943)<br>(729,943)<br>(729,444)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                  | 3327                               | -<br> -    | 7171       | 10:                     |           |
| 8-                                      | (30,065)<br>(30,371)<br>(30,542)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  | b/32CONG_3327RTXCLPII_RAW.m        | ,          | بر<br>-    | 25                      |           |
| 32 32                                   | (31,497)<br>(31,865)<br>(42,159)<br>(32,401)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  | HATC                               |            |            |                         |           |
| - 2                                     | \$\frac{422.159}{423}\$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                  | H<br>الع                           |            |            |                         |           |
| 33<br>34                                | (23, 354)<br>(23, 993)<br>(24, 423)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                  | AW . 1                             |            |            |                         |           |
| 34 35 36                                | 123.399737<br>123.3943<br>123.3923<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>124.1233<br>1 | 4                | 3                                  |            |            |                         |           |
| ¥-                                      | (36.147)<br>136.384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |                                    |            |            |                         |           |
| 37                                      | (158,1974<br>(337,211)<br>(37,681)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |                                    |            |            |                         |           |
| 38 39                                   | 138, 358)<br>138, 358)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                  |                                    |            |            |                         |           |
|                                         | (38.947)<br>(39.397)<br>(79.397)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                  |                                    |            |            |                         |           |
| \$-<br>₫-                               | (40.751)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                  |                                    |            |            |                         |           |
| _                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                  |                                    |            |            |                         |           |

Lab Sample ID: 502112 Client Sample ID: F01009LS31

Matrix : SOIL Sample Type : SAMPLE

Injection Date : 04-OCT-2002 10:25 Analyst Analyst : [w Instrument : 3327\_2.i

Dilution Factor: 1.00

: RTX-CLPII Data File : 03oct021608-r151.d Column

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_2.i/100302\_1/03OCT021608.b/32CONG\_3327RTXCLPII\_RAW.m Reported : 17-Oct-2002 09:56 rrm

|          |                        |          |        |              | FC         | aks            |       | LI LI                   |
|----------|------------------------|----------|--------|--------------|------------|----------------|-------|-------------------------|
| Peak     | Peak                   | Expected | Delta  |              |            | Extract        |       |                         |
| No.      | RT                     | RT       | RT     | Area         | Height     | Conc.<br>(ppb) | Flags | Peak Identification     |
|          |                        |          |        |              | =======    | ========       | ===== |                         |
| 1        | 0.931                  |          |        | 77102        | 7832       |                |       |                         |
| 2        | 1.232                  |          |        | 13487        | 2050       |                |       |                         |
| 3        | 1.782                  |          |        | 216          | 59         |                |       |                         |
| 4<br>5   | 2.631<br>2.733         |          |        | 354<br>491   | 102<br>178 |                |       |                         |
| 6        | 2.800                  |          |        | 1270         | 244        |                |       |                         |
| 7        | 2.944                  |          |        | 1290         | 164        |                |       |                         |
| 8        | 3.243                  |          |        | 535          | 131        |                |       |                         |
| 9        | 3.356                  |          |        | 4489         | 908        | *              | **    |                         |
| 10       | 3.493                  |          |        | 2365         | 656        |                |       |                         |
| 11       | 3.833                  |          |        | 4018         | 676        |                |       |                         |
| 12       | 3.919                  |          |        | 3058         | 596        |                |       |                         |
| 13<br>14 | 4.054                  |          |        | 22229        | 6198       |                |       |                         |
| 15       | 4.427                  |          |        | 4200<br>2063 | 681<br>278 |                |       |                         |
| 16       | 4.586                  |          |        | 1174         | 238        |                |       |                         |
| 17       | 4.690                  |          |        | 8315         | 2883       |                |       |                         |
| 18       | 4.859                  |          |        | 1066         | 227        |                |       |                         |
| 19       | 5.016                  |          |        | 677          | 153        |                |       |                         |
| 20       | 5.380                  | 5.391    | -0.011 | 496561       | 169156     | 44.8499        |       | Tetrachloro-meta-xylene |
| 21       | 5.573                  |          |        | 6519         | 1415       |                |       |                         |
| 22       | 5.794                  |          |        | 1049         | 232        |                |       |                         |
| 23       | 6.018                  |          |        | 5084         | 1477       |                |       |                         |
| 24       | 6.244                  |          |        | 5259         | 1565       |                |       |                         |
| 25<br>26 | 6. <b>497</b><br>7.027 |          |        | 2387<br>3310 | 384        | •              |       |                         |
| 27       | 7.355                  |          |        | 3192         | 551<br>335 |                |       |                         |
| 28       | 7.552                  |          |        | 4306         | 1007       |                |       |                         |
| 29       | 7.823                  |          |        | 3420         | 450        |                |       |                         |
| 30       | 8.213                  |          |        | 3264         | 311        |                |       |                         |
| 31       | 8.454                  |          |        | 1777         | 345        |                |       |                         |
| 32       | 8.523                  |          |        | 2754         | 521        |                |       |                         |
| 33       | 8.689                  |          |        | 637          | 180        |                |       |                         |
| 34       | 8.820                  |          |        | 3127         | 448        |                |       |                         |
| 35<br>36 | 8.953<br>9.082         |          |        | 1773         | 285        |                |       |                         |
| 30<br>37 | 9.339                  |          |        | 4265<br>1216 | 512<br>211 |                |       |                         |
| 38       | 9.445                  |          |        | 5182         | 1424       |                |       |                         |
| 39       | 9.529                  |          |        | 10809        | 1494       |                |       |                         |
| 40       | 10.225                 |          |        | 3368         | 471        |                |       |                         |
| 41       | 10.376                 |          |        | 1778         | 366        |                |       |                         |
| 42       | 10.928                 |          |        | 1053         | 141        |                |       |                         |
| 43       | 11.019                 |          |        | 2130         | 538        |                |       |                         |
| 44       | 11.239                 |          |        | 1298         | 216        |                |       |                         |
| 45       | 11.378                 |          |        | 10448        | 1701       |                |       |                         |
| 46       | 11.768                 |          |        | 1440         | 257        |                |       |                         |
| 47<br>48 | 12.311<br>13.003       |          |        | 1347<br>4014 | 258<br>723 |                |       |                         |
| 49       | 13.386                 |          |        | 12885        | 723<br>404 |                |       |                         |
| 50       | 13.932                 |          |        | 2642         | 388        |                |       |                         |
| 51       | 15.047                 |          |        | 1906         | 274        |                |       |                         |
| 52       | 15.401                 |          |        | 5289         | 815        |                |       |                         |
| 53       | 16.450                 |          |        | 800          | 149        |                |       |                         |
| 54       | 16.716                 |          |        | 1236         | 194        |                |       |                         |
| 55       | 17.638                 |          |        | 349          | 1 T67      |                |       |                         |

| Peak     | Peak             | Expected | Delta  |               |             | Extract<br>Conc. |       |        |   |          |       |  |
|----------|------------------|----------|--------|---------------|-------------|------------------|-------|--------|---|----------|-------|--|
| No.      | RT               | RT       | RT     | Area          | Height      | (ppb)            | Flags |        |   | Identifi |       |  |
| 56       | 17.964           | ======   |        | 1338          | 204         |                  |       |        |   | =======  | ===== |  |
| 57       | 18.576           |          |        | 710           | 45          |                  |       |        |   |          |       |  |
| 58       | 19.187           |          |        | 28020         | 3670        |                  |       |        |   |          |       |  |
| 59       | 19.476           |          |        | 14658         | 2526        |                  |       |        | • |          |       |  |
| 60       | 19.990           |          |        | 4577          | 759         |                  |       |        |   |          |       |  |
| 61       | 20.183           |          |        | 2392          | 290         |                  |       |        |   |          |       |  |
| 62       | 21.448           | 21.462   | -0.013 | 972           | 157         | 1.04758          | a     | BZ#128 |   |          |       |  |
| 63       | 21.579           |          |        | 1959          | 241         |                  | _     |        |   |          |       |  |
| 64       | 21.894           |          |        | 2440          | 319         |                  |       |        |   |          |       |  |
| 65       | 22.091           |          |        | 785           | 131         |                  |       |        |   |          |       |  |
| 66       | 22.444           |          |        | H 1387        | 250         |                  |       |        |   |          |       |  |
| 67       | 22.765           |          |        | 1796          | 225         |                  |       |        |   |          |       |  |
| 68       | 23.073           | 23.115   | -0.042 | 1536          | 296         | 0.574130         | a     | BZ#180 |   |          |       |  |
| 69       | 24.117           |          |        | 415           | 96          |                  |       |        |   |          |       |  |
| 70       | 24.299           |          |        | 3923          | 551         |                  |       |        |   |          |       |  |
| \$ 71    | 24.647           | 24.678   | -0.031 | 563825        | 104784      | 44.0100          |       | BZ#198 |   |          |       |  |
| 72       | 25.829           |          |        | 1113          | 146         |                  |       |        |   |          |       |  |
| 73       | 26.367           |          |        | 15683         | 2911        |                  |       |        |   |          |       |  |
| 74       | 27.613           |          |        | 648           | 64          |                  |       |        |   |          |       |  |
| 75       | 27.990           |          |        | 1907          | 184         |                  |       |        |   |          |       |  |
| 76       | 28.469           |          |        | 4435          | 233         |                  |       |        |   |          |       |  |
| 77       | 28.810           |          |        | 6910          | 570         |                  |       |        |   |          |       |  |
| 78       | 29.043           |          |        | 1733          | 280         |                  |       |        |   |          |       |  |
| 79       | 29.262           |          |        | 711           | 126         | •                | V 8   |        |   |          |       |  |
| 80       | 29.444           |          |        | 782           | 127         |                  |       |        |   |          |       |  |
| 81       | 30.065           |          |        | 6598          | 526         |                  |       |        |   |          |       |  |
| 82       | 30.371           |          |        | 703           | 152         |                  |       |        |   |          |       |  |
| 83       | 30.610           |          |        | 3354          | 313         |                  |       |        |   |          |       |  |
| 84       | 30.741           |          |        | 2725          | 459         |                  |       |        |   |          |       |  |
| 85       | 31.497           |          |        | 12131         | 287         |                  |       |        |   |          |       |  |
| 86       | 31.865           |          |        | 7906          | 557         |                  |       |        |   |          |       |  |
| 87       | 32.159           |          |        | 4208          | 317         |                  |       |        |   |          |       |  |
| 88       | 32.401           |          |        | 2323          | 753         |                  |       |        |   |          |       |  |
| 89       | 32.873           |          |        | 24224         | 3149        |                  |       |        |   |          |       |  |
| 90       | 32.997           |          |        | 3588          | 738         |                  |       |        |   |          |       |  |
| 91       | 33.354           |          |        | 7060          | 603         |                  |       |        |   |          |       |  |
| 92       | 33.605           |          |        | 7207          | 609         |                  |       |        |   |          |       |  |
| 93       | 33.795           |          |        | 5831          | 532         |                  |       |        |   |          |       |  |
| 94       | 34.123           |          |        | 6643          | 417         |                  |       |        |   |          |       |  |
| 95       | 34.290           |          |        | 1961          | 321         |                  |       |        |   |          |       |  |
| 96<br>97 | 34.502<br>34.607 |          |        | 2974<br>10297 | 408<br>1596 |                  |       |        |   |          |       |  |
| 97       | 34.802           |          |        | 2047          | 393         |                  |       |        |   |          |       |  |
| 99       | 34.895           |          |        | 2491          | 385         |                  |       |        |   |          |       |  |
| 100      | 35.114           |          |        | 1867          | 294         |                  |       |        |   |          |       |  |
| 101      | 35.243           |          |        | 2521          | 353         |                  |       |        |   |          |       |  |
| 102      | 35.394           |          |        | 2415          | 398         |                  |       |        |   |          |       |  |
| 103      | 35.520           |          |        | 5050          | 833         |                  |       |        |   |          |       |  |
| 104      | 36.147           |          |        | 2079          | 199         |                  |       |        |   |          |       |  |
| 105      | 36.384           |          |        | 1274          | 255         |                  |       |        |   |          |       |  |
| 106      | 36.719           |          |        | 594           | 155         |                  |       |        |   |          |       |  |
| 107      | 36.797           |          |        | 1916          | 280         |                  |       |        |   |          |       |  |
| 108      | 37.211           |          |        | 3011          | 376         |                  |       |        |   |          |       |  |
| 109      | 37.681           |          |        | 2516          | 463         |                  |       |        |   |          |       |  |
| 110      | 38.093           |          |        | 1314          | 237         |                  |       |        |   |          |       |  |
| 111      | 38.346           |          |        | 1201          | 169         |                  |       |        |   |          |       |  |
| 112      | 38.568           |          |        | 1128          | 146         |                  |       |        |   |          |       |  |
| 113      | 38.947           |          |        | 1081          | 140         |                  |       |        |   |          |       |  |
| 114      | 39.397           |          |        | 6917          | 487         |                  |       |        |   |          |       |  |
| 115      | 40.751           |          |        | 1064          | 139         |                  |       |        |   |          |       |  |
|          |                  |          |        | <b>-</b>      | ===         |                  |       |        |   |          |       |  |

Flags: A - Peak quantitates above calibration range

0079

a - Peak quantitates below reporting limit
H - User selected alternate compound hit

M - Peak manually integrated or manually identified

R - Peak fails recovery

U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

| Peak | Expected | l      |           |          |
|------|----------|--------|-----------|----------|
| RT   | RT       |        | Target    | Compound |
|      |          |        |           |          |
|      |          | Target | Compounds |          |

| Peak   | Expected |                         |
|--------|----------|-------------------------|
| RT     | RT       | Target Compound         |
|        |          |                         |
| 5.380  | 5.391    | Tetrachloro-meta-xylene |
|        | 6.592    | BZ#8                    |
|        | 7.698    | BZ#18                   |
|        | 9.137    | BZ#28                   |
|        | 10.341   | BZ#52                   |
|        | 11.312   | BZ#44                   |
|        | 13.056   | BZ#66                   |
|        | 13.914   | BZ#101                  |
|        | 16.080   | BZ#77                   |
|        | 17.075   | BZ#118                  |
|        | 17.995   | BZ#153                  |
|        | 18.720   | BZ#105                  |
|        | 19.713   | BZ#138                  |
|        | 20.225   | BZ#126                  |
| 21.448 | 21.462   | BZ#128                  |
| 23.073 | 23.115   | BZ#180                  |
| 24.647 | 24.678   | BZ#198                  |
|        | 25.004   | BZ#170                  |
|        | 27.203   | BZ#195                  |
|        | 29.805   | BZ#206                  |
|        | 30.754   | BZ#209                  |

1 4

## FORM 1 OTHER ORGANICS ANALYSIS DATA SHEET

ENVNET SAMPLE NO.

2.6 U

2.6 U

2.6 U

2.6 U

2.6 U

F01009LS32

Lab Name: STL BURLINGTON Contract: 22000

COMPOUND

35065-30-6-----BZ#170

35065-29-3----BZ#180

52663-68-0----BZ#187 52663-78-2----BZ#195

40186-72-9----BZ#206

2051-24-3----BZ#209

CAS NO.

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

Matrix: (soil/water) SOIL Lab Sample ID: 502111

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 030CT021608-R111

% Moisture: 36 decanted: (Y/N) N Date Received: 09/25/02

Extraction: (SepF/Cont/Sonc) SOXH Date Extracted: 09/26/02

Concentrated Extract Volume: 10 (mL) Date Analyzed: 10/04/02

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: \_\_\_ Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/KG

34883-43-7----BZ#8 2.6 U 37680-65-2----BZ#18 2.6 U 7012-37-5----BZ#28 2.6 U 41464-39-5----BZ#44 2.6 U 2.6 U 35693-99-3----BZ#52 32598-10-0----BZ#66 2.6 U 2.6 U 32598-13-3----BZ#77 2.6 U 37680-73-2----BZ#101 32598-14-4----BZ#105 2.6 U 2.6 U 31508-00-6----BZ#118 2.6 U 57465-28-8----BZ#126 2.6 U 38380-07-3----BZ#128 35065-28-2----BZ#138 2.6 U 2.6 U 35065-27-1----BZ#153

FORM I OTHER

|                     |                                              |                    |   |      |   | Y Od | 10^5> |                  |         |      |             |                     |                     |                                | )                                                                                         |
|---------------------|----------------------------------------------|--------------------|---|------|---|------|-------|------------------|---------|------|-------------|---------------------|---------------------|--------------------------------|-------------------------------------------------------------------------------------------|
| 1                   | ,<br>,                                       | , , <del>,</del> , | • | 0.7- |   |      | •     | <b>1</b>         | F.,     | 1.2- |             | 90                  | <u> </u>            | , di                           |                                                                                           |
| μ-                  | (0.896)<br>(1.159)                           |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                | -                                                                                         |
|                     | 71:871)<br>72:108)<br>72:332)                |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                |                                                                                           |
| u-                  |                                              |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                | as di                                                                                     |
|                     | (7, 928)<br>(3, 123)<br>(3, 558)<br>(3, 775) |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                | -                                                                                         |
|                     | H-362500)                                    |                    |   |      | _ |      |       |                  |         |      | -Tebrechlor | <del>o neba i</del> | <del>kylene</del> - | <del>(5,00</del> 3)            | 0 % 5                                                                                     |
| 6-                  | (5,584)<br>(6,000)<br>(2,191)                |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                | Lab Mat: Ana: Inst Col: Inte                                                              |
| -v-                 | c(6,555)<br>c(7,038)<br>c(7,401)             |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                |                                                                                           |
| <b>co</b> -         | 22:363)<br>12:363)                           |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                | Lab Sample Matrix Analyst Instrument Column Integrator Method Reported                    |
| <b>'0</b> -         | >(9,259)                                     |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                |                                                                                           |
| 16-                 | <u>79.645)</u><br>5710.339)                  |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                |                                                                                           |
| <b>#</b> -          | (3.1.48 <u>2</u> )                           |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                |                                                                                           |
| N-                  | (11.497)<br>(11.799)<br>∑(12.440)            |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                | 502111<br>SOIL<br>3327 1<br>RTX-5<br>Falcon<br>/var/cl                                    |
| <b>ن</b>            |                                              |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                | 1.i<br>n<br>n<br>che                                                                      |
| #-                  | BZ#77 (13,788)<br>5714,634)                  |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                | 502111<br>SOIL<br>3327_1.i<br>RTX-5<br>Falcon<br>Falcon<br>/var/chem/332<br>17-Oct-2002 0 |
| 15                  | 1215.656)                                    |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                | ω                                                                                         |
| 16                  | 5(16,304)                                    |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                | 27 1.<br>09:44                                                                            |
| 17                  | (17,314)                                     |                    |   |      |   |      |       |                  |         |      |             |                     |                     | ₹                              | r i /                                                                                     |
| 18-                 | 118,633)                                     |                    |   |      |   |      |       |                  |         |      |             |                     |                     | ltiCar                         | Clier<br>Sampl<br>Injec<br>Dilut<br>Data<br>Compc                                         |
| 19 20<br>Time (Hin) | <del>21</del> 9:2953                         |                    |   |      |   |      |       |                  |         |      |             |                     |                     | HultiChrom GC 03oot021608,1111 | Client Sam Sample Typ Injection Dilution F Data File Compound S 100302_1/03               |
| (Hin)               | (20,451)<br>(20,788)                         |                    |   |      |   |      |       |                  |         |      |             |                     |                     | 03oct0                         | nt Salle Type ction tion File File Sound (2_1/0)                                          |
| 23-                 | (21.471)<br>(21.958)                         |                    |   |      |   |      |       |                  |         |      |             |                     |                     | 21608.                         | Sample Type Type on Dat n Fact le d Subl                                                  |
| 23-                 |                                              |                    |   |      |   |      |       | 3 <b>2#19</b> 8( | 22,552) |      |             |                     |                     | 1111                           |                                                                                           |
| 24                  | 123,381)                                     |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                | ID:                                                                                       |
| 84-                 | <u>(7</u> 24,658)                            |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                | FO<br>SA<br>04<br>1.<br>03<br>03<br>08.                                                   |
| 26                  | 820,2007                                     |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                | F01009L SAMPLE 04-OCT- 1.00 03oct02 SINVNET SINVNET 3.b/32C                               |
| 27                  | (26,507)<br>(27,252)                         |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                | F01009LS32  SAMPLE 04-OCT-2002 07:25 1.00 03oct021608-r111.d ENVNET 8.b/32CONG_3327RTX    |
| 28-                 | }<br>{{23:834}<br>{28:338}                   |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                | 2002<br>2002<br>1608                                                                      |
| 29-                 | <u>(29.118</u> )                             |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                | 07<br>-r1                                                                                 |
| <b>8</b> -          | (29,601)<br>(29,845)<br>(30,530)             |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                | :25<br>11.                                                                                |
| ¥-                  | (39:869)<br>(31:315)                         |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                | Х<br>Г.                                                                                   |
| <b>ਲ</b> -          |                                              |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                | RAW . m                                                                                   |
| ដ                   | 37.552.7987<br>3533.258)<br>>-(33.509)       |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                | #                                                                                         |
| ű.                  | (34,050)<br>(34,702)                         |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                |                                                                                           |
| <b>8</b> -          | (35,216)<br>(35,756)                         |                    |   |      |   |      |       |                  |         |      |             |                     |                     | 97                             |                                                                                           |
| ¥-                  | (36,756)                                     |                    |   |      |   | i    | 4     |                  |         |      |             |                     |                     |                                |                                                                                           |
| 4                   | 777 0741                                     |                    |   |      |   | 4    | •     |                  |         |      |             |                     |                     |                                |                                                                                           |
| <b>%</b> −          | (37,870)                                     |                    |   |      |   |      |       |                  |         |      |             |                     |                     |                                |                                                                                           |
| 39                  | (39,237)                                     |                    |   |      |   |      |       | -                | - n     | ነበሳ  |             |                     |                     |                                |                                                                                           |
| 8-                  |                                              |                    |   |      |   |      |       |                  | U       | 082  |             |                     |                     |                                |                                                                                           |
| <b>#</b> -          |                                              | in .               |   |      |   |      |       | 12               |         |      |             |                     | -                   |                                |                                                                                           |

Lab Sample ID: 502111 Client Sample ID: F01009LS32

Matrix Sample Type : SAMPLE

Analyst Injection Date : 04-OCT-2002 07:25

Instrument : 3327 1.i Dilution Factor: 1.00

Column : RTX-5 Data File : 03oct021608-r111.d

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_1.i/100302\_1/03OCT021608.b/32CONG\_3327RTX5\_RAW.m Reported : 17-Oct-2002 09:44 rrm

Peaks

| eak           | Peak             | Expected | Delta  |                |                | Extract<br>Conc. |       |                         |       |
|---------------|------------------|----------|--------|----------------|----------------|------------------|-------|-------------------------|-------|
| No.           | RT               | RT       | RT     | Area           | Height         | (ppb)            | Flags | Peak Identifica         | ation |
|               |                  |          |        |                |                |                  |       |                         |       |
| 1             | 0.862            |          |        | 1280           | 392            |                  |       |                         |       |
| 2             | 0.896            |          |        | 62194          | 7804           |                  |       |                         |       |
| 3             | 1.159            |          |        | 24436          | 2931           |                  |       |                         |       |
| <b>4</b><br>5 | 1.671<br>1.871   |          |        | 2706<br>2012   | 637<br>457     |                  |       |                         |       |
| 6             | 2.108            |          |        | 447            | 99             |                  |       |                         |       |
| 7             | 2.332            |          |        | 689            | 129            |                  |       |                         |       |
| 8             | 2.928            |          |        | 11791          | 2543           |                  |       |                         |       |
| 9             | 3.119            |          |        | 2806           | 400            | • • •            | * S   |                         |       |
| 10            | 3.323            |          |        | 2345           | 556            |                  |       |                         |       |
| 11            | 3.558            |          |        | 781            | 235            |                  |       |                         |       |
| 12            | 3.775            |          |        | 6592           | 2128           |                  |       |                         |       |
| 13            | 4.305            |          |        | 347            | 87             |                  |       |                         |       |
| 14            | 4.400            |          |        | 5490           | 2136           |                  |       |                         |       |
| 15            | 4.538            |          |        | 275            | 86             |                  |       |                         |       |
| 16            | 4.697            |          |        | 1740           | 433            |                  |       |                         |       |
| 17            | 4.919            | E 001    | 0 000  | 256            | 31             | 42 0762          |       | Tetrachloro-meta-xylene |       |
| 18<br>19      | 5.003<br>5.584   | 5.001    | 0.002  | 342401<br>4499 | 135445<br>1434 | 42.9763          |       | recraciioro-meta-xyrene |       |
| 20            | 5.814            |          |        | 232            | 83             |                  |       |                         |       |
| 21            | 5.870            |          |        | 707            | 195            |                  |       |                         |       |
| 22            | 6.043            |          |        | 469            | 161            |                  |       |                         |       |
| 23            | 6.191            |          |        | 194            | 59             |                  |       |                         |       |
| 24            | 6.555            |          |        | 1562           | 443            |                  |       |                         |       |
| 25            | 7.038            |          |        | 3353           | 911            |                  |       |                         |       |
| 26            | 7.401            |          |        | 335            | 96             |                  |       |                         |       |
| 27            | 7.769            |          |        | 4152           | 842            |                  |       |                         |       |
| 28            | 7.953            |          |        | 2632           | 603            |                  |       |                         |       |
| 29            | 8.089            |          |        | 1402           | 238            |                  |       |                         |       |
| 30            | 8.319            |          |        | 1710           | 433            |                  |       |                         |       |
| 31            | 8.481            |          |        | 3091           | 602            |                  |       |                         |       |
| 32            | 8.607            |          |        | 1828           | 378            |                  |       |                         |       |
| 33<br>34      | 9.259            |          |        | 5097           | 903            |                  |       |                         |       |
| 35            | 9.645            |          |        | 2351<br>4116   | 312<br>830     |                  |       |                         |       |
| 36            | 11.487           |          |        | 1285           | 187            |                  |       |                         |       |
| 37            | 11.606           |          |        | 2750           | 502            |                  |       |                         |       |
| 38            | 11.799           |          |        | 1624           | 240            |                  |       |                         |       |
| 39            | 12.440           |          |        | 4937           | 876            |                  |       |                         |       |
| 40            | 13.788           | 13.752   | 0.035  | 2373           | 209            | 2.53182          | а     | BZ#77                   | 41    |
| 41            | 14.634           |          |        | 3967           | 770            |                  |       |                         |       |
| 42            | 15.656           |          |        | 775            | 173            |                  |       |                         | . 2   |
| 43            | 16.304           |          |        | 8781           | 922            |                  |       |                         |       |
| 44            | 17.314           |          |        | 2269           | 222            |                  |       |                         |       |
| 45            | 18.017           |          |        | 1934           | 410            |                  |       |                         |       |
| 46            | 18.633           |          |        | 324            | 76             |                  |       |                         |       |
| 47            | 18.986           |          |        | 393            | 86             |                  |       |                         |       |
| 48<br>49      | 19.145<br>20.451 |          |        | 623<br>i #29   | 129<br>151     |                  |       |                         |       |
| 50            | 20.451           |          |        | 987            | 151            |                  |       |                         |       |
| 51            | 21.471           |          |        | 1616           | 338            |                  |       |                         |       |
| 52            | 21.958           |          |        | 1157           | 189            |                  |       |                         |       |
| 53            | 22.552           | 22.559   | -0.007 | 334510         | 64850          | 43.4631          |       | BZ#198                  |       |
| 54            | 23.381           |          | ,      | 1770           |                |                  |       |                         |       |
| 55            | 24.658           |          |        | 1281           | - 302<br>191   | 0083             |       |                         |       |

|       |         |          |         |         |          | Extract  |       |                     |
|-------|---------|----------|---------|---------|----------|----------|-------|---------------------|
| Peak  | Peak    | Expected | Delta   |         |          | Conc.    |       |                     |
| No.   | RT      | RT       | RT      | Area    | Height   | (ppb)    | Flags | Peak Identification |
| ===== | ======= | =======  | ======= | ======= | ***===== | ======== | ====  |                     |
| 56    | 25.235  |          |         | 1367    | 188      |          |       |                     |
| 57    | 26.507  |          |         | 1608    | 166      |          |       |                     |
| 58    | 27.252  |          |         | 1840    | 182      |          |       |                     |
| 59    | 27.921  |          |         | 3234    | 422      |          |       | •                   |
| 60    | 28.079  |          |         | 2744    | 318      |          |       |                     |
| 61    | 28.338  |          |         | 3412    | 514      |          |       |                     |
| 62    | 28.509  |          |         | 1117    | 208      |          |       |                     |
| 63    | 29.118  |          |         | 2268    | 228      |          |       |                     |
| 64    | 29.601  |          |         | 4678    | 137      |          |       |                     |
| 65    | 29.845  |          |         | 6183    | 785      |          |       |                     |
| 66    | 30.530  |          |         | 15589   | 1663     |          |       |                     |
| 67    | 30.860  |          |         | 761     | 179      |          |       |                     |
| 68    | 31.009  |          |         | 410     | 77       |          |       |                     |
| 69    | 31.315  |          |         | 1272    | 90       |          |       |                     |
| 70    | 31.492  |          |         | 732     | 144      |          |       |                     |
| 71    | 31.625  |          |         | 565     | 130      |          |       |                     |
| 72    | 31.760  |          |         | 5931    | 572      |          |       |                     |
| 73    | 31.982  |          |         | 399     | 125      |          |       |                     |
| 74    | 32.102  |          |         | 1462    | 329      |          |       |                     |
| 75    | 32.235  |          |         | 4652    | 1150     |          |       |                     |
| 76    | 32.394  |          |         | 1609    | 268      |          |       |                     |
| 77    | 32.499  |          |         | 1728    | 305      |          |       |                     |
| 78    | 32.658  |          |         | 8687    | 1187     |          |       |                     |
| 79    | 32.796  |          |         | 9353    | 1389     |          |       |                     |
| 80    | 33.059  |          |         | 4304    | 610      |          | 55    |                     |
| 81    | 33.150  |          |         | 3454    | 670      |          |       |                     |
| 82    | 33.509  |          |         | 14570   | 2315     |          |       |                     |
| 83    | 34.050  |          |         | 1982    | 326      |          |       |                     |
| 84    | 34.702  |          |         | 7708    | 903      |          |       |                     |
| 85    | 35.210  |          |         | 2439    | 376      |          |       |                     |
| 86    | 35.278  |          |         | 2975    | 448      |          |       |                     |
| 87    | 35.755  |          |         | 3041    | 338      |          |       |                     |
| 88    | 36.486  |          |         | 476     | 94       |          |       |                     |
| 89    | 37.870  |          |         | 1680    | 231      |          |       |                     |
| 90    | 39.237  |          |         | 8283    | 394      |          |       |                     |
|       |         |          |         |         |          |          |       |                     |

Flags: A - Peak quantitates above calibration range

- a Peak quantitates below reporting limit
- H User selected alternate compound hit
- $\ensuremath{\text{M}}$  Peak manually integrated or manually identified
- R Peak fails recovery
- U User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

| Peak   | Expected |                         |
|--------|----------|-------------------------|
| RT     | RT       | Target Compound         |
|        | =======  |                         |
| 5.003  | 5.001    | Tetrachloro-meta-xylene |
|        | 5.761    | BZ#8                    |
|        | 6.701    | BZ#18                   |
|        | 7.925    | BZ#28                   |
|        | 8.984    | BZ#52                   |
|        | 9.667    | BZ#44                   |
|        | 11.243   | BZ#66                   |
|        | 12.207   | BZ#101                  |
| 13.788 | 13.752   | B2#77                   |
|        | 14.938   | BZ#118                  |
|        | 15.993   | BZ#153                  |
|        | 16.155   | BZ#105                  |
|        | 17.328   | BZ#138                  |
|        | 17.762   | BZ#126                  |
|        | 18.647   | BZ#128                  |
|        | 20.781   | BZ#180                  |
|        | 22.271   | BZ#170                  |
| 22.552 | 22.559   | BZ#198                  |
|        | 24.552   | Bz#195 0084             |
|        | 27.655   | BZ#206 0004             |

| Peak    | Expected |                                         |
|---------|----------|-----------------------------------------|
| RT      | RT       | Target Compound                         |
| ======= | =======  | 020200000000000000000000000000000000000 |
|         | 29 180   | B2#209                                  |

|   | μ.         | 60,858) (0,933)<br>\$\(\frac{1}{2}\)(46)<br>\(\frac{1}{2}\)(509)                                               |                                                                                                |          |
|---|------------|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------|
|   | 2          | (4,600)<br>(1,835)                                                                                             |                                                                                                |          |
| l | 1          |                                                                                                                |                                                                                                |          |
|   | ۳.         | 5m(3.360)                                                                                                      | _                                                                                              |          |
| l | •          | G. 839)<br>G. 861)<br>H. 1987                                                                                  |                                                                                                |          |
|   | on-        | Total (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)                                                                  |                                                                                                |          |
|   |            | 75:5773                                                                                                        | Z K H O H Z K                                                                                  |          |
|   | 6-1        | ₹8,283,<br>₽-184}                                                                                              | ns nat nat et                                                                                  | Lab      |
|   | 7-1        | (7,038)<br>(7,338)<br>(4,559)                                                                                  | Matrix Analyst Instrum Column Integra Method Reporte                                           | 1 1      |
|   | 8-         | (7,859)<br>(7,829)                                                                                             | Matrix Analyst Instrume Column Integrat Method Reported                                        | amı      |
|   | 9          | 경<br>경<br>경<br>경<br>경<br>경<br>경<br>경<br>경<br>경<br>경<br>경                                                       | Matrix Analyst Instrument Column Integrator Method Reported                                    | Sample   |
|   | 14.0       |                                                                                                                | ** ** ** ** ** ** **                                                                           | 뷥        |
|   | -1         | (4.57)<br>Statistics                                                                                           |                                                                                                | 5        |
|   | - 37       | <u>⊇</u> ttf:969>                                                                                              | SOIL 3327 RTX-1 Falc /var, 17-0                                                                |          |
|   | 12-        | 73.34A)<br>12.540)                                                                                             | SOIL 3327_2. RIX-CLP Falcon fvar/ch 17-Oct-                                                    | 2111     |
|   | 13- b      | <u>#2</u> 2866 (13,014)<br>[13,391)                                                                            | ָרָרְ.<br>בַּבְּילָבְיּ                                                                        | 1-       |
|   |            | Q3,967>                                                                                                        | SOIL 3327_2.i RTX-CLPII Falcon /var/chem/3 17-Oct-2002                                         |          |
|   | - 8        |                                                                                                                |                                                                                                | H        |
| 1 | 5          | 5(15,412)                                                                                                      | 3327                                                                                           | 1 1      |
|   | 8-         |                                                                                                                | 09:5                                                                                           |          |
|   | 15-        | 116;666}<br>BZB118 (17,077)                                                                                    | 5 1.                                                                                           |          |
|   | 1          |                                                                                                                | ניב                                                                                            |          |
| İ | 8.         | 7.977) 1.18,598) 5(19.207)                                                                                     | Sample Typ<br>Injection<br>Injection F<br>Dilution F<br>Data File<br>Compound S<br>100302_1/03 | 2        |
| - | 19-        | \$\(\frac{19.207}{2}\)                                                                                         | Sampl<br>Injec<br>Dilut<br>Data<br>Compo                                                       | 눖        |
| 1 | 19 20      | E2#138 (19.691)<br>\$20,288}                                                                                   | 1 2 73 12 17 10 1                                                                              | Client   |
|   |            | (20)<br>(20) (562)                                                                                             | le Tyjetion                                                                                    |          |
|   | μ-         | (21.041)                                                                                                       | Type on Don Facile 1d Sul./0300                                                                | Sampl    |
|   | 8-         | 1                                                                                                              | Dat<br>Dat<br>Pact<br>Jubl                                                                     | pl       |
|   | 23         | TC22.455) IZ2.774) IZ2.774)                                                                                    | pe<br>Date<br>Factor<br>Sublis                                                                 | O        |
|   | N.         | (723, 920)                                                                                                     | Type: ion Date: on Factor: ile: ind Sublist: 1/030CT0216                                       | ΙÜ       |
|   | 24         | [23, 320)<br>[24, 313)<br>BZ#198 (24,660)                                                                      | 0 H O H O W                                                                                    |          |
|   | 8-         | BLAZIO (24,000)                                                                                                | SAMPLE<br>04-OCT-2<br>1.00<br>03-Ct021<br>ENVNET<br>08.b/32CC                                  | F01009LS |
|   | 26-        |                                                                                                                | NE CT OCT                                                                                      | 00       |
| l | 27         | (27.001)                                                                                                       | 102 H                                                                                          | JL       |
| 1 | :          | (27,320)<br>(27,637)                                                                                           |                                                                                                | w        |
|   | 8-         | (28.420)                                                                                                       | .608-:<br>NG_3:                                                                                | 2        |
|   | 13-        | ₹28,812)<br>122,931<br>122,931                                                                                 | 07<br>-r1                                                                                      |          |
|   | <u>ي</u> . | 1230,078)                                                                                                      | 07:25<br>r111.                                                                                 |          |
|   | 20         | £38; 34\$3                                                                                                     | TX                                                                                             |          |
|   | 쬬-         | V30;940)<br>(c31,514)                                                                                          | ÇF.                                                                                            |          |
|   | 32-        |                                                                                                                | 07:25<br>r111.d<br>327RTXCLPII                                                                 |          |
|   | 끏-         | 5(31, 874) [32, 166] [32, 166] [33, 265) [33, 265] [33, 265] [33, 265] [33, 265] [33, 265] [33, 265] [34, 265] | 1 1                                                                                            |          |
|   |            | (733, 285)<br>(733, 585)                                                                                       | RA I                                                                                           |          |
|   | 34         | 1234,108)<br>1234,108)                                                                                         | RAW.m                                                                                          |          |
|   | a-         |                                                                                                                | ¤                                                                                              |          |
|   | ي<br>م     | (C55, 298)<br>(X 35, 531)                                                                                      | Ĺ                                                                                              |          |
|   | e          | (36,395)                                                                                                       | 3.                                                                                             | -        |

0086

1.1.2

47-

æ.:

39 40

(37,222)

C39.018)

C39,865)

Lab Sample ID: 502111 Client Sample ID: F01009LS32

Matrix : SOIL Sample Type : SAMPLE

Analyst Injection Date : 04-OCT-2002 07:25

Analyst : Instrument : 3327\_2.i Dilution Factor : 1.00

: RTX-CLPII Column Data File : 03oct021608-r111.d

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_2.i/100302\_1/03OCT021608.b/32CONG\_3327RTXCLPII\_RAW.m Reported : 17-Oct-2002 09:55 rrm

Peaks

| eak           | Peak           | Expected | Delta   |              |            | Extract<br>Conc. |        |                         |           |
|---------------|----------------|----------|---------|--------------|------------|------------------|--------|-------------------------|-----------|
| No.           | RT             | RT       | RT      | Area         | Height     | (ppb)            | Flags  | Peak Identifica         | tion      |
|               |                |          | ******* |              |            |                  |        |                         | ========= |
| 1             | 0.858          |          |         | 527          | 225        |                  |        |                         |           |
| 2             | 0.933          |          |         | 74989        | 7637       |                  |        |                         |           |
| 3             | 1.246          |          |         | 21914        | 3015       |                  |        |                         |           |
| <b>4</b><br>5 | 1.600<br>1.835 |          |         | 629<br>3035  | 123        |                  |        |                         |           |
| 6             | 2.467          |          |         | 3035         | 606<br>93  |                  |        |                         |           |
| 7             | 2.638          |          |         | 247          | 69         |                  |        |                         |           |
| 8             | 2.755          |          |         | 449          | 165        |                  |        |                         |           |
| 9             | 2.795          |          |         | 1808         | 435        |                  | 32     |                         |           |
| 10            | 3.360          |          |         | 11770        | 2819       |                  |        |                         |           |
| 11            | 3.498          |          |         | 2784         | 705        |                  |        |                         |           |
| 12            | 3.839          |          |         | 3412         | 404        |                  |        |                         |           |
| 13            | 4.061          |          |         | 10591        | 2867       |                  |        |                         |           |
| 14            | 4.258          |          |         | 2260         | 351        |                  |        |                         |           |
| 15            | 4.429          |          |         | 1022         | 185        |                  |        |                         |           |
| 16            | 4.595          |          |         | 948          | 200        |                  |        |                         |           |
| 17            | 4.697          |          |         | 7365         | 2510       |                  |        |                         |           |
| 18            | 4.863          |          |         | 728          | 131        |                  |        |                         |           |
| 19            | 5.200          |          |         | 699          | 188        |                  |        |                         |           |
| 20            | 5.311          |          |         | 717          | 185        |                  |        |                         |           |
| 21            | 5.386          | 5.391    | -0.004  | 464689       | 159224     | 42.2538          |        | Tetrachloro-meta-xylene |           |
| 22            | 5.577          |          |         | 3895         | 726        |                  |        | •                       |           |
| 23            | 5.801          |          |         | 324          | 118        |                  |        |                         |           |
| 24            | 6.025          |          |         | 2607         | 719        |                  |        |                         |           |
| 25            | 6.253          |          |         | 5094         | 1449       |                  |        |                         |           |
| 26            | 6.501          |          |         | 989          | 174        |                  |        |                         |           |
| 27            | 6.688          |          |         | 871          | 128        |                  |        |                         |           |
| 28            | 7.038          |          |         | 1939         | 492        |                  |        |                         |           |
| 29            | 7.335          |          |         | 2453         | 274        |                  |        |                         |           |
| 30            | 7.559          |          |         | 3773         | 1005       |                  |        |                         |           |
| 31            | 7.829          |          |         | 891          | 152        |                  |        |                         |           |
| 32            | 8.465          |          |         | 794          | 157        |                  |        |                         |           |
| 33            | 8.528          |          |         | 1888         | 477        |                  |        |                         |           |
| 34            | 8.687          |          |         | 313          | 116        |                  |        |                         |           |
| 35            | 8.820          |          |         | 995          | 193        |                  |        |                         |           |
| 36            | 9.091          | 9.137    | -0.047  | 2222         | 383        | 1.29241          | a      | BZ#28                   |           |
| 37            | 9.456          |          |         | 2013         | 611        |                  |        |                         |           |
| 38            | 9.541          |          |         | 8898         | 1536       |                  |        |                         |           |
| 39            | 10.221         |          |         | 1244         | 238        |                  |        |                         |           |
| 40<br>41      | 10.301         |          |         | 953          | 269        |                  |        |                         |           |
| 41            | 10.385         |          |         | 2250         | 553        |                  |        |                         |           |
| 42            | 11.030         |          |         | 1734<br>4070 | 232<br>889 |                  |        |                         |           |
| 44            | 11.030         |          |         | 1550         | 214        |                  | (4,40) |                         |           |
| 45            | 11.250         |          |         | 12809        | 2061       |                  |        |                         |           |
| 46            | 12.218         |          |         | 409          | 92         |                  |        |                         |           |
| 47            | 12.325         |          |         | 1956         | 420        |                  |        |                         |           |
| 48            | 12.540         |          |         | 548          | 126        |                  |        |                         |           |
| 49            | 13.014         | 13.056   | -0.042  | , 45,60      | 874        | 2.20801          | a      | BZ#66                   |           |
| 50            | 13.391         | 23.030   | 3.042   | 1717         | 178        | 2.20001          | a.     | 22,00                   |           |
| 51            | 13.967         |          |         | 1171         | 151        |                  |        |                         |           |
| 52            | 15.412         |          |         | 4070         | 774        |                  |        |                         |           |
| 53            | 16.461         |          |         | 504          | 98         |                  |        |                         |           |
| 54            | 16.680         |          |         | 314          | 78         |                  |        |                         |           |
| 55            | 17.077         | 17.075   | 0.002   | 499          | ~ 101      | A A 6570         | a      | BZ#118                  |           |

|       |        |          |        |        |         | Extract  |       |                     |
|-------|--------|----------|--------|--------|---------|----------|-------|---------------------|
| Peak  | Peak   | Expected | Delta  |        |         | Conc.    |       |                     |
| No.   | RT     | RT       | RT     | Area   | Height  | (ppb)    | Flags | Peak Identification |
| ===== |        |          |        |        | ======= |          | ===== |                     |
| 56    | 17.977 |          |        | 1668   | 208     |          |       |                     |
| 57    | 18.598 |          |        | 2639   | 371     |          |       |                     |
| 58    | 19.207 |          |        | 12082  | 1386    |          |       |                     |
| 59    | 19.691 | 19.713   | -0.022 | 3529   | 334     | 0.405906 | a     | BZ#138              |
| 60    | 20.001 |          |        | 3349   | 608     |          |       |                     |
| 61    | 20.200 |          |        | 2332   | 220     |          |       |                     |
| 62    | 20.562 |          |        | 1455   | 223     |          |       |                     |
| 63    | 21.041 |          |        | 1714   | 208     |          |       |                     |
| 64    | 21.814 |          |        | 609    | 124     |          |       |                     |
| 65    | 22.455 |          |        | 1227   | 220     |          |       |                     |
| 66    | 22.774 |          |        | 1021   | 155     |          |       |                     |
| 67    | 23.084 | 23.115   | -0.031 | 908    | 193     | 0.528800 | a     | BZ#180              |
| 68    | 23.920 |          |        | 482    | 92      |          | -     | 22,7200             |
| 69    | 24.135 |          |        | 1366   | 313     |          |       |                     |
| 70    | 24.310 |          |        | 3164   | 466     |          |       |                     |
| \$ 71 | 24.660 | 24.678   | -0.018 | 525337 | 98027   | 41.1617  |       | BZ#198              |
| 72    | 26.381 | 21.0.0   | 0.020  | 1018   | 227     | 11.1017  |       | 55,750              |
| 73    | 26.540 |          |        | 643    | 143     |          |       |                     |
| 74    | 27.001 |          |        | 2008   | 196     |          |       |                     |
| 75    | 27.320 |          |        | 857    | 126     |          |       |                     |
| 76    | 27.637 |          |        | 584    | 43      |          |       |                     |
| 77    | 28.420 |          |        | 1004   | 97      |          |       |                     |
| 78    | 28.812 |          |        | 9095   | 736     |          |       |                     |
| 79    | 29.094 |          |        | 4248   | 465     |          |       |                     |
| 80    | 29.267 |          |        | 701    | 150     |          | * *   |                     |
| 81    | 29.451 |          |        | 2580   | 362     |          |       |                     |
| 82    | 30.078 |          |        | 9338   | 704     |          |       |                     |
| 83    | 30.078 |          |        | 7369   | 471     |          |       |                     |
| 84    | 30.743 |          |        | 1737   | 199     |          |       |                     |
| 85    | 31.514 |          |        | 3278   | 149     |          |       |                     |
| 86    | 31.871 |          |        | 6229   | 1025    |          |       |                     |
| 87    |        |          |        |        |         |          |       |                     |
| 88    | 32.166 |          |        | 2930   | 223     |          |       |                     |
|       | 32.297 |          |        | 1133   | 273     |          |       |                     |
| 89    | 32.412 |          |        | 5612   | 1615    |          |       |                     |
| 90    | 32.536 |          |        | 2802   | 485     |          |       |                     |
| 91    | 32.831 |          |        | 7939   | 614     |          |       |                     |
| 92    | 32.882 |          |        | 7485   | 1880    |          |       |                     |
| 93    | 33.075 |          |        | 12338  | 910     |          |       |                     |
| 94    | 33.283 |          |        | 21253  | 1510    |          |       |                     |
| 95    | 33.585 |          |        | 10411  | 1218    |          |       |                     |
| 96    | 33.809 |          |        | 8724   | 899     | •        |       |                     |
| 97    | 34.108 |          |        | 10344  | 742     |          |       |                     |
| 98    | 34.498 |          |        | 4955   | 650     |          |       |                     |
| 99    | 34.615 |          |        | 14967  | 1964    |          |       |                     |
| 100   | 35.298 |          |        | 7322   | 467     |          |       |                     |
| 101   | 35.531 |          |        | 7262   | 1063    |          |       |                     |
| 102   | 36.395 |          |        | 1154   | 202     |          |       |                     |
| 103   | 37.222 |          |        | 5953   | 627     |          |       |                     |
| 104   | 37.907 |          |        | 282    | 79      |          |       |                     |
| 105   | 39.018 |          |        | 1075   | 142     |          |       |                     |
| 106   | 39.865 |          |        | 968    | 152     |          |       |                     |
|       |        |          |        |        |         |          |       |                     |

Flags: A - Peak quantitates above calibration range

U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

| <br>  | т.       | arget Compounds         |
|-------|----------|-------------------------|
| Peak  | Expected |                         |
| RT    | RT       | Target Compound         |
|       |          |                         |
| 5.386 | 5.391    | Tetrachloro-meta-xylene |
|       | 6.592    | BZ#8                    |
|       | 7.698    | BZ#18. 0000             |
| 9.091 | 9.137    | BZ#28 UU88              |

a - Peak quantitates below reporting limit H - User selected alternate compound hit

M - Peak manually integrated or manually identified R - Peak fails recovery

STL Burlington - Target GC Injection Report

| Peak    | Expected |                 |
|---------|----------|-----------------|
| RT      | RT       | Target Compound |
| ======= |          |                 |
|         | 10.341   | BZ#52           |
|         | 11.312   | BZ#44           |
| 13.014  | 13.056   | BZ#66           |
|         | 13.914   | BZ#101          |
|         | 16.080   | BZ#77           |
| 17.077  | 17.075   | BZ#118          |
|         | 17.995   | BZ#153          |
|         | 18.720   | BZ#105          |
| 19.691  | 19.713   | BZ#138          |
|         | 20.225   | BZ#126          |
|         | 21.462   | BZ#128          |
| 23.084  | 23.115   | BZ#180          |
| 24.660  | 24.678   | BZ#198          |
|         | 25.004   | BZ#170          |
|         | 27.203   | BZ#195          |
|         | 29.805   | BZ#206          |
|         | 30.754   | BZ#209          |

#### FORM 1 OTHER ORGANICS ANALYSIS DATA SHEET

ENVNET SAMPLE NO.

F01009LS33

Lab Name: STL BURLINGTON

Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.:

SDG No.: 89891

Matrix: (soil/water) SOIL

Sample wt/vol:

Lab File ID: 030CT021608-R101

% Moisture: 25 decanted: (Y/N) N

30.0 (g/mL) G

Date Received: 09/25/02

Lab Sample ID: 502110

Extraction: (SepF/Cont/Sonc) SOXH

Date Extracted: 09/26/02

Concentrated Extract Volume: 10 (mL)

Date Analyzed: 10/04/02

Injection Volume: 1.0(uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: \_\_\_

Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS:

CAS NO.

COMPOUND

(ug/L or ug/Kg) UG/KG

| *•               |       |
|------------------|-------|
| 34883-43-7BZ#8   | 2.2 U |
| 37680-65-2BZ#18  | 2.2 U |
| 7012-37-5BZ#28   | 2.2 U |
| 41464-39-5BZ#44  |       |
| 35693-99-3BZ#52  | 2.2 U |
| 32598-10-0BZ#66  | 2.2 U |
| 32598-13-3BZ#77  | 2.2 U |
|                  | 2.2 U |
| 37680-73-2BZ#101 | 2.2 U |
| 32598-14-4BZ#105 | 2.2 U |
| 31508-00-6BZ#118 | 2.2 U |
| 57465-28-8BZ#126 | 2.2 U |
| 38380-07-3BZ#128 | 2.2 U |
| 35065-28-2BZ#138 | 2.2 U |
| 35065-27-1BZ#153 | 2.2 U |
| 35065-30-6BZ#170 |       |
| 35065-29-3BZ#180 |       |
| 52663-68-0BZ#187 | 2.2 U |
| 52663-78-2BZ#195 | 2.2 U |
| 40186-72-9BZ#206 | 2.2 U |
| 2051-24-3BZ#209  | 2.2 U |
| 2011207          |       |
|                  |       |

| ° °                                                 | <b>\$</b> | ° 6       | 0.7- | • • • · · ·      | (x10^5)               | 1.0      | 11 EW            | 1.2-     | 1,3                     |                       | 1.5                 |                                                                                                  |           |
|-----------------------------------------------------|-----------|-----------|------|------------------|-----------------------|----------|------------------|----------|-------------------------|-----------------------|---------------------|--------------------------------------------------------------------------------------------------|-----------|
| 938) (0 889)                                        | 9         | · = 1 a a |      | 206 <b>°</b> 206 | 0.8 E <b>Y</b> (2 K0) | r a: 🕈 a | 100 <b>T</b> 100 | <b>Y</b> |                         | S4 00 TSK 96          | <b>Ч</b>            |                                                                                                  |           |
| 71.148)<br>11.656)<br>12.256)                       |           |           |      |                  |                       |          |                  |          |                         |                       |                     |                                                                                                  |           |
| (2,919)                                             |           |           |      |                  |                       |          |                  |          |                         |                       |                     |                                                                                                  |           |
| (3,316)<br>(3,766)<br>(4,2993)<br>(24,690)          |           |           |      |                  |                       |          |                  |          |                         |                       |                     |                                                                                                  |           |
| =(5,577)                                            | =         |           |      |                  |                       |          | <u> </u>         | ¥        | <del>thrachlara n</del> | <del>eta nylene</del> | <del>(1,991</del> ) | MAHUHPA                                                                                          |           |
| 156,548)<br>156,814)                                |           |           |      |                  |                       |          |                  |          |                         |                       |                     | Matrix Analyst Instrum Column Integra Method Reporte                                             | Lab (     |
| -7,393)<br>-2,692)<br>-1,692)<br>-1,692)            |           |           |      |                  |                       |          |                  |          |                         |                       |                     | क ध्राप्त                                                                                        | Sample    |
| ø-<br>; ≥(9,252)                                    |           |           |      |                  |                       |          |                  |          |                         |                       |                     | lent                                                                                             | 1         |
| 57 <u>1</u> 0,330>                                  |           |           |      |                  |                       |          |                  |          |                         |                       |                     |                                                                                                  | ij        |
| (40.864)<br>(41.682)                                |           |           |      |                  |                       |          |                  |          |                         |                       |                     | SOIL  3327 1 RTX-5 Falcon /var/c 17-Oct                                                          | 502       |
| \$-<br>≥(12,431)<br>å-                              |           |           |      |                  |                       |          |                  |          |                         |                       |                     | SOIL 3327_1.i RIX-5 Falcon /var/chem/ 17-Oct-200                                                 | 02110     |
| B2877 (13,774)                                      |           |           |      |                  |                       |          |                  |          |                         |                       |                     | SOIL 3327_1.i 3327_1.i FRIX-5 Falcon /var/chem/3 17-Oct-2002                                     |           |
| े <u>र</u> 14.623)<br>जि                            |           |           |      |                  |                       |          |                  |          | . 9                     |                       |                     | 3327<br>2 09:                                                                                    |           |
| 716.009)<br>7(16.297)<br>736.778)                   |           |           |      |                  |                       |          |                  |          |                         |                       |                     | 7_1.<br>9:44                                                                                     |           |
| (17,312)                                            |           |           |      |                  |                       |          |                  |          |                         |                       | Hult                | r<br>'-                                                                                          |           |
| 1028429 (48 624)                                    |           |           |      |                  |                       |          |                  |          |                         |                       | HultiChrom          | Sampl<br>Injec<br>Dilut<br>Data<br>Compc<br>.00302                                               | Client    |
| 719,143)<br>719,782)<br>8-<br>120,444)<br>1720,779) |           |           |      |                  |                       |          |                  |          |                         |                       | CC 030c             | Sample Typ<br>Injection<br>Dilution F<br>Data File<br>Compound S<br>100302_1/03                  | 1         |
| 121.460)                                            |           |           |      |                  |                       |          |                  |          |                         |                       | GC 03oct021608,i101 | Type<br>ion D<br>on Facile<br>ile<br>id Sul                                                      | Sample    |
| (21.949)<br>(22.277)                                | =         |           |      |                  |                       | BZ#      | 198 (22,546      | <b>,</b> |                         |                       | ), i101             | Sample Type Injection Date: Dilution Factor: Data File Compound Sublist: 100302_1/030CT0216 rm   | 1         |
| 2-<br>> (23,370)<br>2-<br>2-                        |           |           |      |                  |                       |          |                  |          |                         |                       |                     | 2160                                                                                             | IĐ:       |
| (724,392)<br>(724,647)<br>(725,232)                 |           |           |      |                  |                       |          |                  |          |                         |                       |                     | SAMPLE<br>04-OCT<br>1.00<br>03oct0<br>ENVNET<br>)8.b/32                                          | F01       |
| (25,656)<br>(25,937)                                |           |           |      |                  |                       |          |                  |          |                         |                       |                     | SAMPLE<br>04-OCT-<br>1.00<br>03oct02<br>ENVNET<br>8.b/32C                                        | F01009LS3 |
| 3-                                                  |           |           |      |                  |                       |          |                  |          |                         |                       |                     | -2002<br>21608<br>CONG_                                                                          | LS33      |
| N (29,136)                                          |           |           |      |                  |                       |          |                  |          |                         |                       |                     | 2 00<br>8-E                                                                                      |           |
| (29.584)<br>6 (29.839)                              |           |           |      |                  |                       |          |                  |          |                         |                       |                     | SAMPLE<br>04-OCT-2002 06:40<br>1.00<br>03oct021608-r101.d<br>ENVNET<br>8.b/32CONG_3327RTX5_RAW.m |           |
| (30,521)                                            |           |           |      |                  |                       |          |                  |          |                         |                       |                     | Х<br>- 1                                                                                         |           |
| H- (32)<br>(22,002)<br>(22,224                      | >         |           |      |                  |                       |          |                  |          |                         |                       |                     | RAW.                                                                                             |           |
| ર્થ }(33.148)<br>;==(33.503)                        |           |           |      |                  |                       |          |                  |          |                         |                       |                     | В                                                                                                |           |
| (34.689)                                            |           |           |      |                  |                       |          |                  |          |                         |                       |                     |                                                                                                  |           |
| (35,272)<br>(35,746)                                |           |           |      |                  | 9                     |          |                  |          |                         |                       |                     |                                                                                                  | <u></u>   |
| 1                                                   |           |           |      |                  | ii ◀                  |          |                  |          |                         |                       |                     |                                                                                                  |           |
| હ્યું-<br>સુ-ે (238,967)                            |           |           |      |                  |                       |          |                  |          |                         |                       |                     |                                                                                                  |           |
| ଞ୍ଜ- (₹38,967)<br>है-                               |           |           |      |                  |                       | į . ·    | - " 0            | 091      |                         |                       |                     |                                                                                                  |           |
| <u> </u>                                            |           |           |      |                  |                       |          |                  |          |                         |                       |                     |                                                                                                  |           |

Lab Sample ID: 502110 Client Sample ID: F01009LS33

Matrix : SOIL
Analyst : 
Instrument : 3327\_1.i Sample Type : SAMPLE

Injection Date : 04-OCT-2002 06:40

Dilution Factor: 1.00

Column : RTX-5 : 03oct021608-r101.d Data File

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_1.i/100302\_1/030CT021608.b/32CONG\_3327RTX5\_RAW.m Reported : 17-Oct-2002 09:44 rrm

|             | <del></del>      | -              |        |              | P           | eaks      |       |                                         |
|-------------|------------------|----------------|--------|--------------|-------------|-----------|-------|-----------------------------------------|
| Do-1-       | De - S           | m              |        |              |             | Extract   |       |                                         |
| Peak<br>No. | Peak<br>RT       | Expected<br>RT | Delta  | 3 w = -      | **- * * * * | Conc.     |       |                                         |
| NO.         | RT<br>======     | KT             | RT     | Area         | Height      | (ppb)     | Flags | Peak Identification                     |
| 1           |                  |                |        | 1080         | 300         | ========  |       | ======================================= |
| 2           | 0.889            |                |        | 70623        | 7928        |           |       |                                         |
| 3           | 1.148            |                |        | 20823        | 2432        |           |       |                                         |
| 4           | 1.674            |                |        | 1450         | 311         |           |       |                                         |
| 5           | 1.855            |                |        | 954          | 201         |           |       |                                         |
| 6           | 2.095            |                |        | 683          | 131         |           |       |                                         |
| 7           | 2.245            |                |        | 5427         | 974         |           |       |                                         |
| 8<br>9      | 2.919<br>3.316   |                |        | 22672        | 4151        |           | ge w  |                                         |
| 10          | 3.551            |                |        | 4140<br>1120 | 657         |           |       |                                         |
| 11          | 3.766            |                |        | 7206         | 287<br>2470 |           |       |                                         |
| 12          | 4.298            |                |        | 632          | 147         |           |       |                                         |
| 13          | 4.393            |                |        | 3884         | 1367        |           |       |                                         |
| 14          | 4.690            |                |        | 1651         | 538         |           |       |                                         |
| \$ 15       | 4.994            | 5.001          | -0.007 | 366202       | 144229      | 45.7562   |       | Tetrachloro-meta-xylene                 |
| 16          | 5.577            |                |        | 4399         | 1463        |           |       | 11 F                                    |
| 17          | 5.803            |                |        | 816          | 95          |           |       |                                         |
| 18          | 6.034            |                |        | 484          | 178         |           |       |                                         |
| 19<br>20    | 6.548            |                |        | 765          | 251         |           |       |                                         |
| 21          | 6.814<br>7.029   |                |        | 663          | 161         |           |       |                                         |
| 22          | 7.393            |                |        | 2046<br>617  | 578         |           |       |                                         |
| 23          | 7.679            |                |        | 438          | 194<br>102  |           |       |                                         |
| 24          | 7.763            |                |        | 2774         | 620         |           |       |                                         |
| 25          | 7.947            |                |        | 1709         | 401         |           |       |                                         |
| 26          | 8.082            |                |        | 464          | 113         |           |       |                                         |
| 27          | 8.312            |                |        | 1358         | 361         |           |       |                                         |
| 28          | 8.472            |                |        | 1250         | 348         |           |       |                                         |
| 29          | 8.601            |                |        | 1922         | 381         |           |       |                                         |
| 30          | 9.252            |                |        | 5201         | 935         |           |       |                                         |
| 31<br>32    | 9.643            |                |        | 1629         | 199         |           |       |                                         |
| 33          | 10.330<br>10.864 |                |        | 3037         | 535         |           |       |                                         |
| 34          | 11.498           |                |        | 524          | 49          |           |       |                                         |
| 35          | 11.602           |                |        | 1013<br>1799 | 149<br>229  |           |       |                                         |
| 36          | 12.431           |                |        | 7007         | 1120        |           |       |                                         |
| 37          | 13.774           | 13.752         | 0.022  | 1340         | 144         | 2.42643   | a     | BZ#77                                   |
| 38          | 14.623           |                |        | 3064         | 613         |           | _     | 26π / /                                 |
| 39          | 16.009           |                |        | 736          | 110         |           |       |                                         |
| 40          | 16.297           |                |        | 9010         | 903         |           |       |                                         |
| 41          | 16.778           |                |        | 720          | 164         |           |       |                                         |
| 42          | 17.312           |                |        | 1570         | 179         |           |       |                                         |
| 43          | 17.915           |                |        | 335          | 93          |           |       |                                         |
| 44<br>45    | 18.010<br>18.624 | 18.647         | -0.022 | 2364         | 469         | 0.015     |       | 77/100                                  |
| 46          | 19.143           | 10.047         | -0.022 | 823<br>709   | 173<br>132  | 0.0154182 | а     | BZ#128                                  |
| 47          | 19.782           |                |        | 1580         | 268         |           |       |                                         |
| 48          | 20.444           |                |        | 1062         | 187         |           |       |                                         |
| 49          | 20.779           |                |        | 2062         | 222         |           |       |                                         |
| 50          | 21.460           |                |        | 628          | 133         |           |       |                                         |
| 51          | 21.949           |                |        | 2322         | 227         |           |       |                                         |
| 52          | 22.277           |                |        | 621          | 98          |           |       |                                         |
| 53          | 22.546           | 22.559         | -0.013 | 360486       | 70027       | 47.0648   |       | BZ#198                                  |
| 54          | 23.370           |                |        | 9948         | ~ 1406 A    | 0092      |       |                                         |
| 55          | 24.392           |                |        | 1540         | 271         | コロロフ      |       |                                         |

|       |        |          |         |         |         | Extract |       |             |                |
|-------|--------|----------|---------|---------|---------|---------|-------|-------------|----------------|
| Peak  | Peak   | Expected | Delta   |         |         | Conc.   |       |             |                |
| No.   | RT     | RT       | RT      | Area    | Height  | (ppb)   | Flags | Peak        | Identification |
| ===== |        | =======  | ======= | ======= | ======= |         |       | =========== |                |
| 56    | 24.647 |          |         | 1430    | 232     |         |       |             |                |
| 57    | 25.232 |          |         | 1558    | 204     |         |       |             |                |
| 58    | 25.656 |          |         | 864     | 130     |         |       |             |                |
| 59    | 25.937 |          |         | 544     | 107     |         |       |             |                |
| 60    | 27.901 |          |         | 1223    | 201     |         |       |             |                |
| 61    | 28.333 |          |         | 2221    | 412     |         |       |             |                |
| 62    | 28.511 |          |         | 364     | 62      |         |       |             |                |
| 63    | 29.136 |          |         | 2839    | 302     |         |       |             |                |
| 64    | 29.584 |          |         | 2131    | 58      |         |       |             |                |
| 65    | 29.839 |          |         | 5854    | 796     |         |       |             |                |
| 66    | 30.521 |          |         | 24506   | 3138    |         |       |             |                |
| 67    | 31.000 |          |         | 1870    | 45      |         |       |             |                |
| 68    | 31.138 |          |         | 224     | 67      |         |       |             |                |
| 69    | 31.627 |          |         | 368     | 84      |         |       |             |                |
| 70    | 31.752 |          |         | 1591    | 276     |         |       |             |                |
| 71    | 32.002 |          |         | 437     | 139     |         |       |             |                |
| 72    | 32.224 |          |         | 19842   | 4798    |         |       |             |                |
| 73    | 32.567 |          |         | 1046    | 334     |         |       |             |                |
| 74    | 32.678 |          |         | 4281    | 607     |         |       |             |                |
| 75    | 32.789 |          |         | 9339    | 1262    |         |       |             |                |
| 76    | 33.148 |          |         | 13877   | 1178    |         |       |             |                |
| 77    | 33.503 |          |         | 18630   | 3118    |         |       |             |                |
| 78    | 34.035 |          |         | 1158    | 197     |         |       |             |                |
| 79    | 34.128 |          |         | 2256    | 299     |         |       |             |                |
| 80    | 34.689 |          |         | 9822    | 1332    | •       | 8 8   |             |                |
| 81    | 35.272 |          |         | 4126    | 415     |         |       |             |                |
| 82    | 35.746 |          |         | 1515    | 192     |         |       |             |                |
| 83    | 38.967 |          |         | 787     | 117     |         |       |             |                |
|       |        |          |         |         |         |         |       |             |                |

Flags: A - Peak quantitates above calibration range

- a Peak quantitates below reporting limit
- H User selected alternate compound hit
- M Peak manually integrated or manually identified
- R Peak fails recovery
- U User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

Target Compounds

| Peak    | Expected |                         |
|---------|----------|-------------------------|
| RT      | RT       | Target Compound         |
| ======= | =======  |                         |
| 4.994   | 5.001    | Tetrachloro-meta-xylene |
|         | 5.761    | BZ#8                    |
|         | 6.701    | BZ#18                   |
|         | 7.925    | BZ#28                   |
|         | 8.984    | BZ#52                   |
|         | 9.667    | BZ#44                   |
|         | 11.243   | BZ#66                   |
|         | 12.207   | BZ#101                  |
| 13.774  | 13.752   | BZ#77                   |
|         | 14.938   | BZ#118                  |
|         | 15.993   | BZ#153                  |
|         | 16.155   | BZ#105                  |
|         | 17.328   | BZ#138                  |
|         | 17.762   | BZ#126                  |
| 18.624  | 18.647   | BZ#128 ·-               |
|         | 20.781   | BZ#180                  |
|         | 22.271   | BZ#170                  |
| 22.546  | 22.559   | BZ#198                  |
|         | 24.552   | BZ#195                  |
|         | 27.655   | BZ#206                  |
|         | 29.180   | BZ#209                  |
|         |          |                         |

|                       |                                                           |                                       | (x10^5)  |                                         |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |               |
|-----------------------|-----------------------------------------------------------|---------------------------------------|----------|-----------------------------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| •                     | • • • • • • • • • • • • • • • • • • •                     | · · · · · · · · · · · · · · · · · · · | 1.0      | 4 4 4 7 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 | 24 P             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |               |
| μ.                    | (0,962)<br>(1,250)<br>(1,756)                             |                                       |          |                                         | i le             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |               |
| N.                    | <del>\$(£39)</del> ,                                      |                                       |          | = Jl+x                                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |               |
| ω.                    |                                                           |                                       |          |                                         |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |               |
| •                     | ·                                                         |                                       |          |                                         | 0                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |               |
| OR-                   | 20,200)                                                   |                                       | <u>1</u> | Taharat lana arka                       |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1 1           |
| •                     | ₹5,577)<br>₹6,627)<br><b>E</b> (6,255)<br><b>46,619</b> ) |                                       |          |                                         | wlene (6,399)    | Ma<br>In<br>Ree                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Lab           |
| 7                     | (6.619)<br>(7.040)                                        |                                       |          |                                         |                  | Matrix<br>Analyst<br>Instrum<br>Column<br>Integra<br>Method<br>Reporte                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |               |
| 6.                    | (7,040)<br>(元,295)<br>(7,561)<br>(元,829)                  |                                       |          |                                         | = = :-           | Matrix Analyst Instrument Column Integrator Method Reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Sample        |
|                       | (78,539)<br>-t8,791)<br>- <u>18</u> Z#28 (9,093)          |                                       |          |                                         |                  | ent<br>tor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ple           |
| ]                     | <del>罗约.58</del> 8)                                       |                                       |          |                                         |                  | · · · · · ·                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Ü             |
| 16                    | 1279:2963                                                 |                                       |          |                                         |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |               |
| #                     | (40,882)<br>>(11,391)<br>(11,680)                         |                                       |          |                                         |                  | SOIL 3327 RTX- Falce /var, 17-0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 50            |
| ₽.                    | (12,329)                                                  |                                       |          |                                         | ļ                | SOIL 3327_2. RTX-CLP RTS/ch /var/ch 17-Oct-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 502110        |
| <u>ٿ</u>              | DBZ#66 (13,018)<br>(13,382)                               |                                       |          |                                         |                  | 1 T M .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0             |
| 2                     |                                                           |                                       |          |                                         |                  | i<br>PII<br>nem/3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |               |
| 15                    |                                                           |                                       |          | · · · (8 52                             |                  | 2 33                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |               |
| <b>1</b> 5            | 5(15.417)                                                 |                                       |          |                                         |                  | •• [                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |               |
| 15                    | 1716,465)                                                 |                                       |          |                                         |                  | ຫັນ<br>ຫຼຸ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |
| 16                    |                                                           |                                       |          |                                         | ᡓ                | /1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |
|                       | (£18,585)                                                 |                                       |          |                                         | HultiChrom       | Sampinje<br>Inje<br>Dilut<br>Data<br>Data<br>Compo                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2             |
| 19 20 2<br>Time (Hin) | EZ#138 (19.695)                                           |                                       |          |                                         | 33               | Sample Ty<br>Injection<br>Dilution 1<br>Data File<br>Compound (<br>100302_1/0;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Client        |
| (Hin)                 | BZ#138 (19,695)<br>5(20,001)<br>628;331)                  |                                       |          |                                         | 03oct            | 1 5 31 12 6 6 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | - 1           |
| 15                    |                                                           |                                       |          |                                         | 03oct021608,i101 | Type on Don Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Factor on Fact | Sample        |
| 12                    | (21.912)<br>(722.457)                                     |                                       |          |                                         | 8, 110;          | pe<br>Date<br>Factor<br>Sublis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ple           |
| 8                     | (C23, 388)                                                |                                       |          |                                         | 7                | Pe<br>Date<br>Factor<br>Sublist                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Ħ             |
| 24                    | * 1                                                       |                                       |          |                                         |                  | 60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |
| 23.                   | ·                                                         |                                       |          | BZ#198 (24.663)                         |                  | SAN<br>04-<br>1.0<br>03c<br>ENV<br>8.k                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | FOI           |
| 2                     | (25,842)                                                  |                                       |          |                                         |                  | SAMPLE<br>04-OCT-2002 06:40<br>1.00<br>03oct021608-r101.d<br>ENVNET<br>8.b/32CONG_3327RTX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1009LS33      |
| 27                    | ≥(26,383)                                                 |                                       |          |                                         |                  | I-2<br>521<br>521<br>F<br>200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ST6           |
| 28                    | ₹27 <b>.9</b> 77>                                         |                                       |          |                                         |                  | 2002<br>2002                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <u>ω</u><br>ω |
| 29                    | (28,420)                                                  |                                       |          |                                         |                  | 3-3-3-0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |
| 1 :                   |                                                           |                                       |          |                                         |                  | 06:40<br>r101.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ĺ             |
| 30 31                 | (70 614)                                                  |                                       |          |                                         |                  | D d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |               |
|                       | \L31.494)                                                 |                                       |          |                                         |                  | CLP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | -             |
| 32                    | (32,282,417)                                              |                                       |          |                                         |                  | ji -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |               |
| ដ                     | 0733,585)                                                 |                                       |          |                                         |                  | 'RA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |               |
| <u>ي</u>              | (34.148)                                                  |                                       |          | .•                                      |                  | 2 06:40<br>8-r101.d<br>_3327RTXCLPII_RAW.m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |
| 쎯                     | (34,618)<br>(135,333)                                     |                                       |          |                                         |                  | <b>a</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |
| <u>ل</u> ا            |                                                           | 9                                     |          |                                         |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |               |
| 37                    | £36,395)                                                  |                                       | 4        |                                         |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |               |
|                       |                                                           |                                       |          |                                         | 1                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |               |

0094

(39.024)

Lab Sample ID: 502110 Client Sample ID: F01009LS33

: SOIL Sample Type Matrix : SAMPLE

Injection Date : 04-OCT-2002 06:40 Analyst

Instrument : 3327 2.i Dilution Factor : 1.00

Data File : 03oct021608-r101.d Column : RTX-CLPII

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_2.i/100302\_1/03OCT021608.b/32CONG\_3327RTXCLPII\_RAW.m Reported : 17-Oct-2002 09:55 rrm

|          |                  |          |         |               |            | Extract  |       |                         |           |
|----------|------------------|----------|---------|---------------|------------|----------|-------|-------------------------|-----------|
| eak      | Peak             | Expected | Delta   |               |            | Conc.    |       |                         |           |
| No.      | RT               | RT       | RT      | Area          | Height     | (ppb)    | Flags | Peak Identifi           |           |
| 1        | 0.962            |          | ******* | 85720         | 8235       |          |       |                         | .======== |
| 2        | 1.250            |          |         | 22067         | 2505       |          |       |                         |           |
| 3        | 1.756            |          |         | 1325          | 186        |          |       |                         |           |
| 4        | 2.638            |          |         | 350           | 102        |          |       |                         |           |
| 5        | 2.797            |          |         | 10410         | 1470       |          |       |                         |           |
| 6        | 3.363            |          |         | 20220         | 4658       |          |       |                         |           |
| 7        | 3.498            |          |         | 4279          | 977        |          |       |                         |           |
| 8        | 3.841            |          |         | 3629          | 441        |          |       |                         |           |
| 9        | 4.063            |          |         | 13623         | 3335       | ***      | 8     |                         |           |
| 10       | 4.597            |          |         | 1519          | 293        |          |       |                         |           |
| 11       | 4.697            |          |         | 5042          | 1625       |          |       |                         |           |
| 12       | 5.205            |          |         | 498           | 142        |          |       |                         |           |
| 13       | 5.389            | 5.391    | -0.002  | 501396        | 170450     | 45.1881  |       | Tetrachloro-meta-xylene | •         |
| 14       | 5.577            |          |         | 4518          | 909        |          |       |                         |           |
| 15       | 6.027            |          |         | 3592          | 880        |          |       |                         |           |
| 16       | 6.255            |          |         | 4882          | 1512       |          |       |                         |           |
| 17       | 6.619            |          |         | 614           | 157        |          |       |                         |           |
| 18       | 7.040            |          |         | 1752          | 315        |          |       |                         |           |
| 19       | 7.295            |          |         | 309           | 42         |          |       |                         |           |
| 20       | 7.561            |          |         | 2335          | 612        |          |       |                         |           |
| 21       | 7.829            |          |         | 947           | 135        |          |       |                         |           |
| 22       | 8.539            |          |         | 2356          | 322        |          |       |                         |           |
| 23       | 8.791            |          |         | 191           | 57         |          |       |                         |           |
| 24       | 9.093            | 9.137    | -0.044  | 1887          | 391        | 1.29703  | a     | BZ#28                   |           |
| 25       | 9.459            |          |         | 1003          | 323        | •        |       |                         |           |
| 26       | 9.545            |          |         | 6345          | 1088       |          |       |                         |           |
| 27       | 10.217           |          |         | 700           | 195        |          |       |                         |           |
| 28       | 10.390           |          |         | 1979          | 450        |          |       |                         |           |
| 29       | 10.937           |          |         | 863           | 139        |          |       |                         |           |
| 30       | 11.032           |          |         | 1931          | 499        |          |       |                         |           |
| 31<br>32 | 11.391<br>11.680 |          |         | 13129<br>447  | 2194<br>79 |          |       |                         |           |
| 33       |                  |          |         | 454           | 127        |          |       |                         |           |
| 34       | 12.329<br>13.018 | 13.056   | -0.038  | 4844          | 1067       | 2.32480  |       | BZ#66                   |           |
| 35       | 13.382           | 13.030   | -0.038  | 888           | 138        | 2.32400  | a     | 52#00                   |           |
| 36       | 13.930           |          |         | 1000          | 182        |          |       |                         |           |
| 37       | 14.650           |          |         | 1811          | 378        |          |       |                         |           |
| 38       | 15.417           |          |         | 4371          | 688        |          |       |                         |           |
| 39       | 16.465           |          |         | 1073          | 168        |          |       |                         |           |
| 40       | 17.988           |          |         | 1523          | 207        |          |       |                         |           |
| 41       | 18.585           |          |         | 835           | 51         |          |       |                         |           |
| 42       | 19.212           |          |         | 10703         | 1392       |          |       |                         |           |
| 43       | 19.695           | 19.713   | -0.018  | 3191          | 322        | 0.399959 | a     | BZ#138                  |           |
| 44       | 20.001           |          |         | 3131          | 591        |          | **    |                         |           |
| 45       | 20.196           |          |         | 1493          | 202        |          |       |                         |           |
| 46       | 20.331           |          |         | 1120          | 196        |          |       |                         |           |
| 47       | 21.912           |          |         | 2223          | 300        |          |       |                         | 1-00      |
| 48       | 22.457           |          |         | 1356          | 237        |          |       |                         |           |
| 49       | 22.783           |          |         | . 1455        | 196        |          |       |                         |           |
| 50       | 23.082           | 23.115   | -0.033  | ¹ <b>8</b> 15 | 184        | 0.524839 | e a   | BZ#180                  |           |
| 51       | 23.388           |          |         | 962           | 163        |          |       |                         |           |
| 52       | 24.144           |          |         | 506           | 114        |          |       |                         |           |
| 53       | 24.315           |          |         | 2850          | 430        |          |       |                         |           |
| 54       | 24.663           | 24.678   | -0.016  | 575972        | 105891     | 44.4766  |       | BZ#198                  |           |
| 55       | 25.842           |          |         | 1236          | 776        | 0095     |       |                         |           |

STL Burlington - Target GC Injection Report

|      |         |          |         |         |         | Extract  |       |                     |
|------|---------|----------|---------|---------|---------|----------|-------|---------------------|
| Peak | Peak    | Expected | Delta   |         |         | Conc.    |       |                     |
| No.  | RT      | RT       | RT      | Area    | Height  | (ppb)    | Flags | Peak Identification |
|      | ======= | ======== | ======= | ======= | ======= | ======== | ===== |                     |
| 56   | 26.383  |          |         | 9490    | 1517    |          |       |                     |
| 57   | 27.977  |          |         | 3648    | 407     |          |       |                     |
| 58   | 28.420  |          |         | 1689    | 202     |          |       | •                   |
| 59   | 28.823  |          |         | 5910    | 486     |          |       |                     |
| 60   | 29.103  |          |         | 2073    | 213     |          |       |                     |
| 61   | 29.267  |          |         | 584     | 123     |          |       |                     |
| 62   | 29.462  |          |         | 1072    | 168     |          |       |                     |
| 63   | 29.890  |          |         | 2505    | 329     |          |       |                     |
| 64   | 30.080  |          |         | 4224    | 558     |          |       |                     |
| 65   | 30.614  |          |         | 3631    | 301     |          |       |                     |
| 66   | 30.750  |          |         | 2922    | 472     |          |       |                     |
| 67   | 31.494  |          |         | 9065    | 127     |          |       |                     |
| 68   | 31.873  |          |         | 5697    | 1009    |          |       |                     |
| 69   | 32.281  |          |         | 4078    | 204     |          |       |                     |
| 70   | 32.417  |          |         | 18347   | 3689    |          |       |                     |
| 71   | 32.884  |          |         | 27341   | 7343    |          |       |                     |
| 72   | 33.101  |          |         | 6341    | 659     |          |       |                     |
| 73   | 33.285  |          |         | 9817    | 869     |          |       |                     |
| 74   | 33.585  |          |         | 11445   | 928     |          |       |                     |
| 75   | 34.148  |          |         | 8464    | 555     |          |       |                     |
| 76   | 34.618  |          |         | 21111   | 2550    |          |       |                     |
| 77   | 35.278  |          |         | 4792    | 382     |          |       |                     |
| 78   | 35.402  |          |         | 4448    | 766     |          |       |                     |
| 79   | 35.531  |          |         | 6075    | 998     |          | * 5   |                     |
| 80   | 36.395  |          |         | 739     | 134     |          |       |                     |
| 81   | 36.825  |          |         | 1363    | 169     |          |       |                     |
| 82   | 37.227  |          |         | 10167   | 1167    |          |       |                     |
| 83   | 39.024  |          |         | 989     | 155     |          |       |                     |
| 84   | 39.882  |          |         | 659     | 115     |          |       |                     |

Flags: A - Peak quantitates above calibration range

- a Peak quantitates below reporting limit
  H User selected alternate compound hit
- $\ensuremath{\mathrm{M}}$  Peak manually integrated or manually identified
- R Peak fails recovery
- U User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

|        |      |       | -    |
|--------|------|-------|------|
| Target | t Co | OCIMC | unds |

| Peak    | Expected |                         |
|---------|----------|-------------------------|
| RT      | RT       | Target Compound         |
| ======= | =======  |                         |
| 5.389   | 5.391    | Tetrachloro-meta-xylene |
|         | 6.592    | BZ#8                    |
|         | 7.698    | BZ#18                   |
| 9.093   | 9.137    | BZ#28                   |
|         | 10.341   | BZ#52                   |
|         | 11.312   | BZ#44                   |
| 13.018  | 13.056   | BZ#66                   |
|         | 13.914   | BZ#101                  |
|         | 16.080   | BZ#77                   |
|         | 17.075   | BZ#118                  |
|         | 17.995   | BZ#153                  |
|         | 18.720   | BZ#105                  |
| 19.695  | 19.713   | BZ#138                  |
|         | 20.225   | BZ#126                  |
|         | 21.462   | BZ#128                  |
| 23.082  | 23.115   | BZ#180                  |
| 24.663  | 24.678   | BZ#198                  |
|         | 25.004   | BZ#170                  |
|         | 2,7.203  | BZ#195                  |
|         | 29.805   | BZ#206                  |
|         | 30.754   | BZ#209                  |
|         |          |                         |

-- 0096

### FORM 1 OTHER ORGANICS ANALYSIS DATA SHEET

ENVNET SAMPLE NO.

F01009LS41

Lab Name: STL BURLINGTON

Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.:

SDG No.: 89891

Matrix: (soil/water) SOIL

Lab Sample ID: 502115

Sample wt/vol:

30.0 (g/mL) G

Lab File ID: 030CT021608-R181

% Moisture: 27 decanted: (Y/N) N

Date Received: 09/25/02

Extraction: (SepF/Cont/Sonc) SOXH

Date Extracted: 09/26/02

Concentrated Extract Volume: 10(mL)

Date Analyzed: 10/04/02

Injection Volume: 1.0(uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: \_\_\_\_

Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS:

CAS NO.

COMPOUND

(ug/L or ug/Kg) UG/KG

| 34883-43-7BZ#8   |             | 2.3 U   |
|------------------|-------------|---------|
| 37680-65-2BZ#18  | <del></del> | 2.3 U   |
|                  |             | 2.3 U   |
| 7012-37-5BZ#28   |             | 2.3 U   |
| 41464-39-5BZ#44  |             | -       |
| 35693-99-3BZ#52  |             | 2.3 U   |
| 32598-10-0BZ#66  |             | 2.3 U   |
| 32598-13-3BZ#77  |             | 2.3 U   |
| 37680-73-2BZ#101 |             | 2.3 U   |
| 32598-14-4BZ#105 |             | ⊬ 2.3 U |
| 31508-00-6BZ#118 |             | 2.3 U   |
| 57465-28-8BZ#126 |             | 2.3 U   |
| 38380-07-3BZ#128 |             | 2.3 U   |
| 35065-28-2BZ#138 |             | 2.3 U   |
|                  |             | 2.3 U   |
| 35065-27-1BZ#153 |             | 2.3 U   |
| 35065-30-6BZ#170 |             | l l     |
| 35065-29-3BZ#180 |             |         |
| 52663-68-0BZ#187 | (2.7        | 2.3 U   |
| 52663-78-2BZ#195 | 501         | 2.3 U   |
| 40186-72-9BZ#206 |             | 2.3 U   |
| 2051-24-3BZ#209  |             | 2.3 ប   |
|                  |             |         |

FORM I OTHER

| 2-                | C1.866)<br>(2.104)<br>H2:463)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |     |                 |                 |                   |                                                                                                          |            |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----------------|-----------------|-------------------|----------------------------------------------------------------------------------------------------------|------------|
| 3-<br>4-          | (20)<br>(36)<br>(36)<br>(36)<br>(36)<br>(30)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40)<br>(40) |     | 1               | Tahasahlara aah |                   |                                                                                                          |            |
| 8 4 9             | (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1 4 |                 |                 |                   | Matrix Analyst Instrument Column Integrator Method Reported                                              | Lab Sample |
| 200               | x(9,252)<br>x(9,645)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |                 |                 |                   | ' ' ' ' ' '                                                                                              | ID         |
| (1)               | 110,332)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |     |                 |                 |                   |                                                                                                          | D:         |
| 12                | 111.611>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |     |                 |                 |                   | SOIL 3327_1 RTX-5 Falcon /var/c 17-Oct                                                                   | 502        |
| 2 13              | 7(12,438)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |                 |                 |                   | L<br>7_1<br>-5<br>con<br>con                                                                             | 02115      |
| 3                 | 1713.464)<br>BZ#77 (13.785)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |     |                 |                 |                   | SOIL 3327 1.i RTX-5 Falcon /var/chem/3 17-Oct-2002                                                       |            |
| 15                | 1214.630)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |                 |                 |                   | (L)                                                                                                      |            |
| 16                | BZ#114 (15,452)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |                 | to (3)          |                   | 09:                                                                                                      |            |
| 17                | (16,293)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |     |                 |                 |                   | 4 1<br>5 ·                                                                                               |            |
| 7 18              | (17,312)<br>(18,015)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |                 |                 |                   | 1/10<br>1/10<br>2<br>1/20<br>2<br>1/20<br>2                                                              |            |
| - 17              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |                 |                 | Hul tiChrom       | Sampl<br>Injec<br>Injec<br>Dilut<br>Data )<br>Compon<br>100302<br>rm                                     | CLi        |
| 19                | ₩3:326}<br>129.786>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |                 |                 | 8                 | nplut;<br>ut;<br>ut;<br>a ]                                                                              | Client     |
| 25-<br>25-<br>25- | (20,444)<br>(20,775)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |                 |                 | 03oct021608, i181 | Sample Typ<br>Injection<br>Dilution F<br>Data File<br>Compound S<br>L00302_1/03                          |            |
| 22                | (21,468)<br>(21,949)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |                 |                 | 21608.            | Type : SAMPLE on Date : 04-OCT-200 n Factor : 1.00 : 03oct02160 d Sublist: ENVNET ./03OCT021608.b/32CONG | Sampl      |
| 23                | (22.271)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |     | BZ#198 (22,550) |                 | 1181              | pe : Date : Factor : : Sublist: 30CT0216                                                                 | le         |
| 3 24              | (23,379)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |     |                 |                 |                   | r :                                                                                                      | ID:        |
| - 12              | <u>(2</u> 4,652)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |     |                 |                 |                   | S2<br>0.2<br>0.3<br>0.3                                                                                  | l i        |
| Ω <del>-</del>    | Į                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |     |                 |                 | ,                 | SAMPLE<br>04-OCT-<br>1.00<br>1.00<br>03oct02<br>ENVNET<br>8.b/32C                                        | 10         |
| 26                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |                 |                 |                   | SAMPLE<br>04-OCT-2<br>1.00<br>03oct021<br>ENVNET<br>8.b/32CO                                             | F01009L    |
| 27 28             | (27,640)<br>(27,914)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |                 |                 |                   | 200<br>160<br>ONG                                                                                        | S41        |
| :                 | #28:338}                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |     |                 |                 |                   | 8-r<br>133                                                                                               |            |
| 293               | (29,158)<br>(29,564)<br>(29,847)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |     |                 |                 |                   | 12:41<br>-r181.d<br>3327RTX                                                                              |            |
| 30 31             | 1 ~                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |                 |                 |                   | 2 12:41<br>8-r181.d<br>_3327RTX5                                                                         |            |
| ž                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |                 |                 |                   |                                                                                                          |            |
| 32 3              | (12.226)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |     |                 |                 |                   | RAW.m                                                                                                    |            |
| 33                | (33.532)<br>(30.532)<br>(31.473)<br>(31.573)<br>(31.575)<br>(31.575)<br>(31.575)<br>(31.575)<br>(31.575)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |     |                 | 5               |                   | ä                                                                                                        |            |
| 34                | <u>5(</u> 34,715)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |     |                 | 72              | İ                 | l                                                                                                        |            |
| 1                 | (35.243)<br>(35.645)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |                 |                 |                   |                                                                                                          |            |
| 36 37             | 136.207)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1.  |                 |                 |                   | 90.                                                                                                      |            |
| 37                | <del>[23</del> 9:8993                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 38  |                 |                 |                   |                                                                                                          |            |

0098

\$ •

1.0

°,5

-(0,891) --(1,213)

38

39

8 <u>#</u>- E36:8523

(39:839)

Lab Sample ID: 502115 Client Sample ID: F01009LS41

Matrix : SOIL Sample Type : SAMPLE

Analyst :  $\sim$  Instrument : 3327\_1.i Injection Date : 04-OCT-2002 12:41

Dilution Factor: 1.00

Data File : 03oct021608-r181.d Column : RTX-5

Integrator : Falcon Compound Sublist: ENVNET

: /var/chem/3327\_1.i/100302\_1/030CT021608.b/32CONG\_3327RTX5\_RAW.m Method

Peaks

Reported : 17-Oct-2002 09:45 rrm

| P€ | eak      | Peak             | Expected | Delta  |               |             | Extract<br>Conc. |       |                         | _ |
|----|----------|------------------|----------|--------|---------------|-------------|------------------|-------|-------------------------|---|
|    | VО.      | RT               | RT       | RT     | Area          | Height      | (ppb)            | Flags | Peak Identificat        |   |
| == | 1        | 0.891            | =======  | ====== | 77081         | 8107        |                  | ===== |                         |   |
|    | 2        | 1.213            |          |        | 69729         | 8921        |                  |       |                         |   |
|    | 3        | 1.866            |          |        | 786           | 172         |                  |       |                         |   |
|    | 4        | 2.104            |          |        | 1708          | 224         |                  |       |                         |   |
|    | 5        | 2.325            |          |        | 1265          | 236         |                  |       |                         |   |
|    | 6        | 2.463            |          |        | 495           | 104         |                  |       |                         |   |
|    | 7        | 2.922            |          |        | 2497          | 450         |                  |       |                         |   |
|    | 8        | 3.106            |          |        | 1439          | 233         | •                |       |                         |   |
|    | 9        | 3.316            |          |        | 3679          | 635         |                  |       |                         |   |
|    | 10       | 3.553            |          |        | 1391<br>13820 | 279<br>4076 |                  |       |                         |   |
|    | 11<br>12 | 3.771<br>4.054   |          |        | 529           | 111         |                  |       |                         |   |
|    | 13       | 4.300            |          |        | 648           | 145         |                  |       |                         |   |
|    | 14       | 4.396            |          |        | 5979          | 1954        |                  |       |                         |   |
|    | 15       | 4.693            |          |        | 2887          | 891         |                  |       |                         |   |
| \$ | 16       | 4.999            | 5.001    | -0.002 | 344493        | 135840      | 43.1013          |       | Tetrachloro-meta-xylene |   |
|    | 17       | 5.404            |          |        | 856           | 146         |                  |       |                         |   |
|    | 18       | 5.579            |          |        | 4204          | 1422        |                  |       |                         |   |
|    | 19       | 5.808            |          |        | 246           | 83          |                  |       |                         |   |
|    | 20       | 5.865            |          |        | 827           | 240         |                  |       |                         |   |
|    | 21       | 6.038            |          |        | 432           | 162         |                  |       |                         |   |
|    | 22       | 6.193<br>6.550   |          |        | 254<br>581    | 66<br>219   |                  |       |                         |   |
|    | 23<br>24 | 6.781            |          |        | 698           | 126         |                  |       |                         |   |
|    | 25       | 7.031            |          |        | 1733          | 426         |                  |       |                         |   |
|    | 26       | 7.262            |          |        | 194           | 72          | ·                |       |                         |   |
|    | 27       | 7.395            |          |        | 641           | 232         |                  |       |                         |   |
|    | 28       | 7.763            |          |        | 3592          | 695         |                  |       |                         |   |
|    | 29       | 7.949            | 7.925    | 0.024  | 1233          | 270         | 0.339781         | L a   | BZ#28                   |   |
|    | 30       | 8.315            |          |        | 572           | 166         |                  |       |                         |   |
|    | 31       | 8.474            |          |        | 1717          | 406         |                  |       |                         |   |
|    | 32       | 8.605            |          |        | 1386          | 265         |                  |       |                         |   |
|    | 33       | 9.252            |          |        | 4547<br>1113  | 867<br>136  |                  |       |                         |   |
|    | 34<br>35 | 9.645<br>10.332  |          |        | 952           | 224         |                  |       |                         |   |
|    | 36       | 11.611           |          |        | 409           | 92          |                  |       |                         |   |
|    | 37       | 12.438           |          |        | 1595          | 347         |                  |       |                         |   |
|    | 38       | 13.464           |          |        | 1509          | 200         |                  |       |                         |   |
|    | 39       | 13.785           | 13.752   | 0.033  | 1518          | 106         | 2.36482          | a     | BZ#77                   |   |
|    | 40       | 14.630           |          |        | 1175          | 235         |                  |       |                         |   |
|    | 41       | 15.452           |          |        | 552           | 113         |                  |       |                         |   |
|    | 42       | 16.009           |          |        | 917           | 153         |                  |       |                         |   |
|    | 43       | 16.293           |          |        | 23264         | 2157        |                  |       |                         |   |
|    | 44       | 17.312           |          |        | 3171          | 322         |                  |       |                         |   |
|    | 45       | 18.015           |          |        | 2364<br>1156  | 441<br>170  |                  |       |                         |   |
|    | 46       | 19.136<br>19.329 |          |        | 318           | 65          |                  |       |                         |   |
|    | 48       | 19.329           |          |        | 1220          | 198         |                  |       |                         |   |
|    | 49       | 20.444           |          |        | a 865         | 168         |                  |       |                         |   |
|    | 50       | 20.775           |          |        | 2479          | 281         |                  |       |                         |   |
|    | 51       | 21.468           |          |        | 407           | 86          |                  |       |                         |   |
|    | 52       | 21.949           |          |        | 1195          | 212         |                  |       |                         |   |
|    | 53       | 22.271           |          |        | 688           | 121         |                  |       |                         |   |
| \$ | 54       | 22.550           |          | -0.009 | 333192        |             |                  |       | BZ#198                  |   |
|    | 55       | 23.379           |          |        | 680           | 7 127       | 0099             |       |                         |   |

STL Burlington - Target GC Injection Report

|          |                  |          |         |             |            | Extract   |       |                     |
|----------|------------------|----------|---------|-------------|------------|-----------|-------|---------------------|
| Peak     | Peak             | Expected | Delta   |             |            | Conc.     |       |                     |
| No.      | RT               | RT       | RT      | Area        | Height     | (ppb)     | Flags | Peak Identification |
| =====    | ======           |          | ======= | =======     |            | ========= | ===== |                     |
| 56       | 24.652           |          |         | 769         | 133        |           |       |                     |
| 57       | 27.640           |          |         | 2709        | 264        |           |       |                     |
| 58       | 27.914           |          |         | 913         | 129        |           |       |                     |
| 59       | 28.336           |          |         | 1784        | 311        |           |       |                     |
| 60       | 28.520           |          |         | 981         | 171        |           |       |                     |
| 61       | 29.158           |          |         | 3141        | 241        |           |       |                     |
| 62       | 29.564           |          |         | 4558        | 276        |           |       |                     |
| 63       | 29.847           |          |         | 3735        | 349        |           |       |                     |
| 64       | 30.532           |          |         | 6202        | 706        |           |       |                     |
| 65       | 30.883           |          |         | 380         | 43         |           |       |                     |
| 66<br>67 | 31.173           |          |         | 277         | 55         |           |       |                     |
| 68       | 31.322<br>31.497 |          |         | 335         | 52         |           |       |                     |
| 69       | 31.497           |          |         | 335         | 77         |           |       |                     |
| 70       | 31.747           |          |         | 394<br>4145 | 104<br>301 |           |       |                     |
| 71       | 31.747           |          |         | 533         | 79         |           |       |                     |
| 72       | 32.226           |          |         | 5269        | 1148       |           |       |                     |
| 73       | 32.392           |          |         | 854         | 136        |           |       |                     |
| 74       | 32.583           |          |         | 480         | 138        |           |       |                     |
| 75       | 32.711           |          |         | 1563        | 377        |           |       |                     |
| 76       | 32.787           |          |         | 2999        | 872        |           |       |                     |
| 77       | 32.893           |          |         | 2223        | 468        |           |       |                     |
| 78       | 33.011           |          |         | 3060        | 512        |           |       |                     |
| 79       | 33.221           |          |         | 1457        | 453        |           |       |                     |
| 80       | 33.299           |          |         | 4460        | 587        | •         | \$0 B |                     |
| 81       | 33.505           |          |         | 13182       | 2126       |           |       |                     |
| 82       | 33.809           |          |         | 1721        | 199        |           |       |                     |
| 83       | 34.041           |          |         | 515         | 114        |           |       |                     |
| 84       | 34.119           |          |         | 904         | 237        |           |       |                     |
| 85       | 34.201           |          |         | 2566        | 291        |           |       |                     |
| 86       | 34.715           |          |         | 3417        | 580        |           |       |                     |
| 87       | 35.143           |          |         | 720         | 195        |           |       |                     |
| 88       | 35.261           |          |         | 1645        | 220        |           |       |                     |
| 89       | 35.495           |          |         | 1488        | 398        |           |       |                     |
| 90       | 35.640           |          |         | 1231        | 229        |           |       |                     |
| 91       | 36.207           |          |         | 632         | 113        |           |       |                     |
| 92       | 36.599           |          |         | 1938        | 352        |           |       |                     |
| 93       | 36.746           |          |         | 1166        | 212        |           |       |                     |
| 94<br>95 | 36.888           |          |         | 1032        | 147        |           |       |                     |
| 95<br>96 | 37.074           |          |         | 1606        | 237        |           |       |                     |
| 96       | 37.856<br>38.042 |          |         | 535         | 117        |           |       |                     |
| 97       | 38.042           |          |         | 268<br>904  | 51         |           |       |                     |
| 99       | 39.067           |          |         | 1598        | 181<br>292 |           |       |                     |
| 22       | 33.007           |          |         | 1376        | 232        |           |       |                     |

- a Peak quantitates below reporting limit
- H User selected alternate compound hit
- M Peak manually integrated or manually identified
- R Peak fails recovery
- U User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

| Taro | et  | Compounds |  |
|------|-----|-----------|--|
| Iary | C L | Compounds |  |

| Peak    | Expected |                         |
|---------|----------|-------------------------|
| RT      | RT       | Target Compound         |
| ======= |          |                         |
| 4.999   | 5.001    | Tetrachloro-meta-xylene |
|         | 5.761    | BZ#8                    |
|         | 6.701    | BZ#18                   |
| 7.949   | 7.925    | BZ#28                   |
|         | 8.984    | BZ#52                   |
|         | 9.667    | BZ#44                   |
|         | 11.243   | BZ#66                   |
|         | 12.207   | BZ#101                  |
| 13.785  | 13.752   | BZ#77                   |
|         | 14.938   | BZ#118 0 1 0 0          |
|         | 15.993   | BZ#153 U 1 U U          |

STL Burlington - Target GC Injection Report

| Peak<br>RT | Expected<br>RT | Target Compound |
|------------|----------------|-----------------|
|            |                |                 |
|            | 16.155         | BZ#105          |
|            | 17.328         | BZ#138          |
|            | 17.762         | BZ#126          |
|            | 18.647         | BZ#128          |
|            | 20.781         | BZ#180          |
|            | 22.271         | BZ#170          |
| 22.550     | 22.559         | BZ#198          |
|            | 24.552         | BZ#195          |
|            | 27.655         | BZ#206          |
|            | 29.180         | BZ#209          |

|                     | (0.935)                                                                         |    |      |             |    |              |                                |                                |                                            |                                 |          |
|---------------------|---------------------------------------------------------------------------------|----|------|-------------|----|--------------|--------------------------------|--------------------------------|--------------------------------------------|---------------------------------|----------|
| 20 E                | 1,975)<br>2,263)                                                                |    |      |             |    |              |                                |                                |                                            |                                 |          |
| u l                 | (4:573)<br>(4:573)                                                              |    |      |             |    |              |                                |                                |                                            |                                 |          |
|                     | 65, 7669)<br>(                                                                  |    |      |             |    | <del>-</del> |                                |                                |                                            |                                 |          |
| 6-                  | (5, 758)<br>(5, 794)<br>(6, 616)<br>(6, 244)<br>(6, 495)                        |    |      |             |    | 1207 3001    | <del>oro-nebo-xylene (5,</del> | <b>4.48</b> )                  | Column<br>Integra<br>Method<br>Report      | Matrix<br>Analys<br>Instru      | Lab      |
| 200                 | ⑦,029)<br>(7,359)<br>(7,352)<br>(7,820)<br>(4,115)                              |    |      |             |    |              |                                |                                | Column<br>Integrator<br>Method<br>Reported | Matrix<br>Analyst<br>Instrument | Sample   |
| ٠                   | では、<br>では、<br>では、<br>でき、<br>でき、<br>でき、<br>でき、<br>でき、<br>でき、<br>でき、<br>でき        |    |      |             |    |              |                                |                                | tor                                        | ent                             |          |
| آنوا                | ₹8:37 <b>8</b> }                                                                |    |      |             |    |              |                                |                                |                                            |                                 | ID:      |
| 12-                 | (11.021)<br>111.7380)<br>(11.762)                                               | F0 |      |             |    |              |                                |                                | RTX-CL<br>Falcon<br>/var/c<br>17-Oct       | SOIL<br>3327                    | 50211    |
| - 3                 | \$12,316)<br>BZ#66 (13,007)                                                     |    |      |             |    |              |                                |                                | X-CLP<br>lcon<br>ar/ch<br>-Oct-            | N<br>N                          | 15       |
| 100                 | (3,3,389)<br>(4,4,049)                                                          |    |      |             |    |              |                                |                                |                                            | <u>.</u> .                      |          |
| 15                  | [15,053)<br>[(15,410)<br>[(15,925)                                              |    |      |             |    | •- 10        |                                |                                | 3327<br>2 09:                              |                                 |          |
| , en.               | (16.448)<br>(16.714)                                                            |    |      |             |    |              |                                |                                | : 56                                       |                                 |          |
| :                   | <u>(1</u> 7,975)                                                                |    |      |             |    |              |                                | HI.                            | 01/<br>01/<br>0                            | O H G                           |          |
|                     | (18,55° (18,718)<br>(19,199)                                                    |    |      |             |    |              |                                | iChro                          | Data<br>Compo<br>100302<br>rm              | amp<br>nje                      | H        |
| 19 20<br>Time (Hin) | (BZ#138 (19,691)<br>5719.990)<br>120.194)                                       |    |      |             |    |              |                                | HultiChrom GC 03oct021608.i181 | 1 5 4                                      | le<br>cti                       | Client 9 |
| 21 22               | T21.034)<br>BZ#128 (21.446)<br>T21.896)                                         |    |      |             |    |              |                                | t021608.i                      | U ()                                       | י ב                             | Sampl    |
| 23                  | (22,453)<br>(22,756)<br>(82#180 (23,080)                                        |    |      |             |    |              |                                | 181                            | Sublist<br>30CT021                         | pe<br>Date<br>Factor            | Le ID    |
| 2-                  | (724-1289)                                                                      |    |      |             |    | •            |                                | ļ                              | 90 1                                       |                                 | l "      |
| 24                  | M2#170 (24.973)                                                                 |    | <br> | <del></del> |    | BZ#198 (24,6 | 52)                            |                                | 03oct02<br>ENVNET<br>8.b/32C               | SAMPLE<br>04-OCT-               | F01009LS |
| 28-                 |                                                                                 |    |      |             |    | *            |                                |                                | VET<br>VET                                 | CO<br>ETE                       | 200      |
| 27                  | (26.631)                                                                        |    |      |             |    |              |                                |                                | 22                                         | N                               |          |
| 28-                 | (27,992)<br>(728,309)                                                           |    |      |             |    |              |                                |                                |                                            | 002                             | 41       |
| 13-                 | (28:828)<br>(29:267)                                                            |    |      |             |    |              |                                |                                | 3-r181.d<br>_3327RTXCLPII_RAW.m            | 12                              |          |
| <b>ઝ</b> -          | (29.694)<br>(230.071)                                                           |    |      |             |    |              |                                |                                | r181.<br>327RT                             | 12:41                           |          |
| 딾-                  | (38:365)                                                                        |    |      |             |    |              |                                |                                | d<br>d                                     |                                 |          |
| <b>3</b> 5−         | (31,488)<br>(31,865)<br>(32,270)                                                |    |      |             |    |              |                                |                                | Пd                                         |                                 |          |
| 3 <del>.</del>      | 35-853>                                                                         |    |      |             |    |              |                                |                                | r z                                        |                                 | - 1      |
| <u>ي</u>            | (₹33,365)<br>(₹33,594)<br>(\$34,403)                                            |    |      |             |    | 9            |                                |                                | AW.                                        |                                 |          |
| 34                  | 11 103<br>12 103<br>13 103<br>13 103<br>14 103<br>15 103<br>15 103<br>17 35 522 |    |      |             |    |              |                                |                                | Ħ                                          |                                 |          |
| 36                  | (36,039)<br>(36,389)<br>(36,796)                                                |    |      | •           |    |              |                                |                                |                                            | 2                               |          |
| 37                  | (37,216)                                                                        |    |      |             |    |              |                                |                                |                                            |                                 |          |
| 8-                  | 137:632)<br>(38:105)<br>(38:572)                                                |    |      | 120         |    |              |                                |                                |                                            |                                 |          |
| 39                  | (38,958)<br>)(39,408)                                                           |    |      | _           | 0: | 102          |                                |                                |                                            |                                 |          |
| 8-                  | <u> </u>                                                                        |    |      |             | U, | TUC          |                                |                                |                                            |                                 |          |

1.0-

11 12 13 14 15

Lab Sample ID: 502115 Client Sample ID: F01009LS41

Matrix : SOIL Sample Type : SAMPLE

Analyst : Injection Date : 04-OCT-2002 12:41

Instrument : 3327 2.i Dilution Factor : 1.00

Column : RTX-CLPII Data File : 03oct021608-r181.d

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_2.i/100302\_1/030CT021608.b/32CONG\_3327RTXCLPII\_RAW.m

Peaks

Reported : 17-Oct-2002 09:56 rrm

| Doo!-    | D=-1-            | D        | Del+-       |                    |             | Extract                   |       |                         |  |
|----------|------------------|----------|-------------|--------------------|-------------|---------------------------|-------|-------------------------|--|
| Peak     | Peak             | Expected | Delta<br>RT | 3                  | Unight      | Conc.                     | Floor | Dook Identifie          |  |
| No.      | RT<br>======     | RT       | KI          | Area<br>=======    | Height      | (ppb)                     | Flags | Peak Identific          |  |
| 1        | 0.935            |          |             | 95239              | 8381        |                           |       |                         |  |
| 2        | 1.255            |          |             | 107969             | 13547       |                           |       |                         |  |
| 3        | 1.975            |          |             | 411                | 75          |                           |       |                         |  |
| 4        | 2.263            |          |             | 492                | 87          |                           |       |                         |  |
| 5        | 2.627            |          |             | 1558               | 155         |                           |       |                         |  |
| 6        | 2.733            |          |             | 781                | 208         |                           |       |                         |  |
| 7        | 2.919            |          |             | 603                | 126         |                           |       |                         |  |
| 8        | 3.236            |          |             | 596                | 156         |                           |       |                         |  |
| 9        | 3.356            |          |             | 2759               | 475         | •                         | (4)   |                         |  |
| 10       | 3.493            |          |             | 2319               | 618         |                           |       |                         |  |
| 11       | 3.764            |          |             | 579                | 156         |                           |       |                         |  |
| 12       | 3.833            |          |             | 1449               | 391         |                           |       |                         |  |
| 13       | 4.052            |          |             | 18159              | 5521        |                           |       |                         |  |
| 14       | 4.252            |          |             | 2941               | 501         |                           |       |                         |  |
| 15       | 4.427            |          |             | 1726               | 265         |                           |       |                         |  |
| 16       | 4.595            |          |             | <del>9</del> 70    | 194         |                           |       |                         |  |
| 17       | 4.688            |          |             | 6980               | 2322        |                           |       |                         |  |
| 18       | 4.872            |          |             | 881                | 165         |                           |       |                         |  |
| 19       | 5.216            |          |             | 368                | 97          |                           |       |                         |  |
| 20       | 5.378            | 5.391    | -0.013      | 469201             | 159576      | 42.3458                   |       | Tetrachloro-meta-xylene |  |
| 21       | 5.568            |          |             | 6133               | 1272        |                           |       |                         |  |
| 22       | 5.794            |          |             | 1677               | 201         |                           |       |                         |  |
| 23       | 6.016            |          |             | 5010               | 1430        |                           |       |                         |  |
| 24       | 6.244            |          |             | 4831               | 1470        |                           |       |                         |  |
| 25       | 6.495            |          |             | 1312               | 213         |                           |       |                         |  |
| 26       | 7.029            |          |             | 2136               | 318         |                           |       |                         |  |
| 27       | 7.359            |          |             | 2011               | 183         |                           |       |                         |  |
| 28       | 7.552            |          |             | 2037               | 514         |                           |       |                         |  |
| 29       | 7.820            |          |             | 571                | 133         |                           |       |                         |  |
| 30       | 8.115            |          |             | 231                | 76          |                           |       |                         |  |
| 31       | 8.454            |          |             | 846                | 179         |                           |       |                         |  |
| 32       | 8.547            |          |             | 2094               | 328         |                           |       |                         |  |
| 33       | 8.825            |          |             | 475                | 107         |                           |       |                         |  |
| 34       | 9.082            |          |             | 1257               | 234         |                           |       |                         |  |
| 35       | 9.450            |          |             | 1127               | 389         |                           |       |                         |  |
| 36       | 9.532            |          |             | 7001               | 1295        |                           |       |                         |  |
| 37       | 10.225           |          |             | 741                | 154         |                           |       |                         |  |
| 38       | 10.376           |          |             | 923                | 213         |                           |       |                         |  |
| 39<br>40 | 11.021<br>11.247 |          |             | 797<br><b>4</b> 95 | 226<br>100  |                           |       |                         |  |
|          |                  |          |             |                    |             |                           |       |                         |  |
| 41<br>42 | 11.380           |          |             | 13052<br>876       | 2157<br>151 |                           |       |                         |  |
| 43       | 11.762<br>12.316 |          |             | 414                | 90          |                           |       |                         |  |
|          |                  | 12 056   | -0.049      | 2356               | 405         | 1 92420                   | à°    | BZ#66                   |  |
| 44<br>45 | 13.007<br>13.389 | 13.056   | -0.049      | 1752               | 248         | 1.92420                   | a     | D2#00                   |  |
| 46       | 14.049           |          |             | 3241               | 191         |                           |       |                         |  |
| 47       | 15.053           |          |             | 665                | 117         |                           |       |                         |  |
| 48       | 15.410           |          |             | 2773               | 364         |                           |       |                         |  |
| 49       | 15.410           |          |             | 497                | 92          |                           |       |                         |  |
| 50       | 16.448           |          |             | 888                | 139         |                           |       |                         |  |
| 51       | 16.714           |          |             | 984                | 146         |                           |       |                         |  |
| 52       | 17.975           |          |             | 2199               | 284         |                           |       |                         |  |
| 53       | 18.560           |          |             | 1033               | 99          |                           |       |                         |  |
| 54       | 18.718           | 18.720   | -0.002      | 427                |             | 2 81603                   | a     | BZ#105                  |  |
| 55       | 19.199           | _3.,_0   | J. 552      | 31018              | 83<br>3494  | $01^{\!\!\!2}0^{\!\!\!3}$ | -     |                         |  |

|       |         |          |        |         |         | Extract  |       |        |                                         |
|-------|---------|----------|--------|---------|---------|----------|-------|--------|-----------------------------------------|
| Peak  | Peak    | Expected | Delta  |         |         | Conc.    |       |        |                                         |
| No.   | RT      | RT       | RT     | Area    | Height  | (ppb)    | Flags |        | Peak Identification                     |
| ===== | ======= |          |        | ======= | ======= |          |       |        | ======================================= |
| 56    | 19.691  | 19.713   | -0.022 | 6603    | 522     | 0.499080 | a     | BZ#138 |                                         |
| 57    | 19.990  |          |        | 4328    | 702     |          |       |        |                                         |
| 58    | 20.194  |          |        | 2764    | 318     |          |       |        | 2                                       |
| 59    | 21.034  |          |        | 1146    | 186     |          |       |        |                                         |
| 60    | 21.245  |          |        | 255     | 37      |          |       |        |                                         |
| 61    | 21.446  | 21.462   | -0.016 | 797     | 136     | 1.03835  | a     | BZ#128 |                                         |
| 62    | 21.896  |          |        | 1076    | 178     |          |       |        |                                         |
| 63    | 22.453  |          |        | 1276    | 229     |          |       |        |                                         |
| 64    | 22.756  |          |        | 638     | 130     |          |       |        |                                         |
| 65    | 23.080  | 23.115   | -0.035 | 1710    | 326     | 0.587333 | a     | BZ#180 |                                         |
| 66    | 24.128  |          |        | 368     | 84      |          |       |        |                                         |
| 67    | 24.299  |          |        | 4149    | 617     |          |       |        |                                         |
| \$ 68 | 24.652  | 24.678   | -0.027 | 535021  | 100155  | 42.0587  |       | BZ#198 |                                         |
| 69    | 24.973  | 25.004   | -0.031 | 4063    | 447     | 0.955157 | a     | BZ#170 |                                         |
| 70    | 26.631  |          |        | 2780    | 274     |          |       | 25     |                                         |
| 71    | 27.992  |          |        | 420     | 90      |          |       |        |                                         |
| 72    | 28.309  |          |        | 530     | 35      |          |       |        |                                         |
| 73    | 28.828  |          |        | 6772    | 565     |          |       |        |                                         |
| 74    | 29.045  |          |        | 1529    | 242     |          |       |        |                                         |
| 75    | 29.267  |          |        | 467     | 80      |          |       |        |                                         |
| 76    | 29.694  |          |        | 4074    | 196     |          |       |        |                                         |
| 77    | 30.071  |          |        | 5133    | 385     |          |       |        |                                         |
| 78    | 30.741  |          |        | 3397    | 293     |          |       |        |                                         |
| 79    | 30.889  |          |        | 2345    | 340     |          | . 2   |        |                                         |
| 80    | 31.488  |          |        | 575     | 52      | •        | *     |        |                                         |
| 81    | 31.865  |          |        | 2456    | 369     |          |       |        |                                         |
| 82    | 32.270  |          |        | 3510    | 195     |          |       |        |                                         |
| 83    | 32.401  |          |        | 2000    | 664     |          |       |        |                                         |
| 84    | 32.873  |          |        | 17269   | 2055    |          |       |        |                                         |
| 85    | 33.000  |          |        | 6812    | 716     |          |       |        |                                         |
| 86    | 33.365  |          |        | 5790    | 504     |          |       |        | 3                                       |
| 87    | 33.594  |          |        | 4516    | 505     |          |       |        |                                         |
| 88    | 34.103  |          |        | 4710    | 391     |          |       |        |                                         |
| 89    | 34.298  |          |        | 1696    | 254     |          |       |        |                                         |
| 90    | 34.509  |          |        | 2078    | 318     |          |       |        |                                         |
| 91    | 34.607  |          |        | 8883    | 1380    |          |       |        |                                         |
| 92    | 34.802  |          |        | 1624    | 315     |          |       |        |                                         |
| 93    | 34.901  |          |        | 1868    | 314     |          |       |        |                                         |
| 94    | 35.114  |          |        | 1310    | 215     | 155.1    |       |        |                                         |
| 95    | 35.252  |          |        | 2130    | 298     |          |       |        |                                         |
| 96    | 35.522  |          |        | 4891    | 916     | •        |       |        |                                         |
| 97    | 36.039  |          |        | 482     | 128     |          |       |        |                                         |
| 98    | 36.389  |          |        | 1067    | 217     |          |       |        |                                         |
| 99    | 36.726  |          |        | 585     | 143     |          |       |        |                                         |
| 100   | 36.797  |          |        | 1732    | 226     |          |       |        |                                         |
| 101   | 37.216  |          |        | 2050    | 297     |          |       |        |                                         |
| 102   | 37.686  |          |        | 2489    | 454     |          |       |        |                                         |
| 103   | 37.832  |          |        | 1209    | 186     |          |       |        |                                         |
| 104   | 38.105  |          |        | 1288    | 227     |          |       |        |                                         |
| 105   | 38.351  |          |        | 1264    | 180     |          |       |        |                                         |
| 106   | 38.572  |          |        | 1065    | 139     |          |       |        |                                         |
| 107   | 38.958  |          |        | 787     | 118     |          |       |        |                                         |
| 108   | 39.408  |          |        | 7032    | 521     |          |       |        |                                         |
|       |         |          |        |         |         |          |       |        |                                         |

U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

| Targe | <b>-</b> † | COmn | O11 | ınde |
|-------|------------|------|-----|------|

| Peak  | Expected |                         |
|-------|----------|-------------------------|
| RT    | RT       | Target Compound         |
|       |          |                         |
| 5.378 | 5.391    | Tetrach or fet 4-xylene |
|       | 6.592    | BZ#8 UIUH               |

a - Peak quantitates below reporting limit

H - User selected alternate compound hit

M - Peak manually integrated or manually identified

R - Peak fails recovery

STL Burlington - Target GC Injection Report

| Peak   | Expected |                 |
|--------|----------|-----------------|
| RT     | RT       | Target Compound |
|        |          |                 |
|        | 7.698    | BZ#18           |
|        | 9.137    | BZ#28           |
|        | 10.341   | BZ#52           |
|        | 11.312   | BZ#44           |
| 13.007 | 13.056   | BZ#66           |
|        | 13.914   | BZ#101          |
|        | 16.080   | BZ#77           |
|        | 17.075   | BZ#118          |
|        | 17.995   | BZ#153          |
| 18.718 | 18.720   | BZ#105          |
| 19.691 | 19.713   | BZ#138          |
|        | 20.225   | BZ#126          |
| 21.446 | 21.462   | BZ#128          |
| 23.080 | 23.115   | BZ#180          |
| 24.652 | 24.678   | BZ#198          |
| 24.973 | 25.004   | BZ#170          |
|        | 27.203   | BZ#195          |
|        | 29.805   | BZ#206          |
|        | 30.754   | BZ#209          |

## FORM 1 OTHER ORGANICS ANALYSIS DATA SHEET

ENVNET SAMPLE NO.

F01009LS42

Lab Name: STL BURLINGTON

Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.:

SDG No.: 89891

Matrix: (soil/water) SOIL

Lab Sample ID: 502114

Sample wt/vol:

30.0 (g/mL) G

Lab File ID: 030CT021608-R171

% Moisture: 29 decanted: (Y/N) N Date Received: 09/25/02

Extraction: (SepF/Cont/Sonc) SOXH

Date Extracted: 09/26/02

Concentrated Extract Volume: 10 (mL)

Date Analyzed: 10/04/02

Injection Volume: 1.0(uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS:

CAS NO. COMPOUND

(ug/L or ug/Kg) UG/KG

|                  | ·- <u>8</u> 8 |       |
|------------------|---------------|-------|
| 34883-43-7BZ#8   | li i          | 2.4 U |
| 37680-65-2BZ#18  |               | 2.4 U |
| 7012-37-5BZ#28   |               | 2.4 U |
| 41464-39-5BZ#44  |               | 2.4 U |
| 35693-99-3BZ#52  |               | 2.4 U |
| 32598-10-0BZ#66  |               | 2.4 U |
| 32598-13-3BZ#77  |               | 2.4 U |
| 37680-73-2BZ#101 |               | 2.4 U |
| 32598-14-4BZ#105 |               | 2.4 U |
| 31508-00-6BZ#118 |               | 2.4 U |
| 57465-28-8BZ#126 |               | 2.4 U |
| 38380-07-3BZ#128 |               | 2.4 U |
| 35065-28-2BZ#138 |               | 2.4 U |
| 35065-27-1BZ#153 |               | 2.4 U |
| 35065-30-6BZ#170 |               | 2.4 U |
| 35065-29-3BZ#180 |               | 2.4 U |
| 52663-68-0BZ#187 |               | 2.4 U |
| 52663-78-2BZ#195 |               | 2.4 U |
| 40186-72-9BZ#206 |               | 2.4 U |
| 2051-24-3BZ#209  |               | 2.4 U |
|                  |               | II.   |

| (1.150)                                                                         | (0,889)         |                         |                  |                                                                                |
|---------------------------------------------------------------------------------|-----------------|-------------------------|------------------|--------------------------------------------------------------------------------|
| 2, 313)<br>(1, 334)<br>(1, 334)<br>(1, 337)<br>(1, 337)<br>(1, 337)<br>(1, 337) |                 |                         | *==              |                                                                                |
| (5,260)<br>(5,579)<br>(5,663)<br>(5,663)<br>(5,663)<br>(5,663)                  |                 | Tetrachloro meta mylemo | -(4.999)         | Matrix<br>Analys<br>Instru<br>Column<br>Integra<br>Method<br>Report            |
| 전: <sup>362</sup> }<br><b>전: 26<sup>2</sup>간 .</b> 933)<br>[1] : [26]           |                 |                         |                  | Matrix Analyst Instrument Column Integrator Method Reported                    |
| <u>r</u> 9,252)<br><b>r9,696</b> )                                              |                 |                         |                  | й <del>Г</del>                                                                 |
| C11.471)<br>C11.872)<br>C122.438)                                               |                 |                         |                  | SOIL  3327_1 RTX-5 Falcon /var/c 17-Oct                                        |
| 92877 (13,774)<br>(14,672)                                                      |                 | · 03 04                 |                  | ω                                                                              |
| 878114 (15,459)<br>115,654)<br>(16,015)<br>(16,304)                             |                 |                         |                  | 27_1.<br>09:45                                                                 |
| 7(17,317)<br>5(18,015)<br>4(18,416)                                             |                 |                         | HultiChron       | i/1                                                                            |
| (19,134)<br>(19,784)                                                            |                 |                         | 8                | Sample Type Injection Dat Dilution Fact Data File Compound Subl 100302_1/030CT |
| 120.447)<br>120.777)<br>(21.468)<br>(21.962)<br>(22.277)                        |                 |                         | 03oct021608,1171 |                                                                                |
|                                                                                 | BZ#198 (22.550) |                         | 171              | Pe<br>Date<br>Factor<br>Sublist                                                |
| 123,690)<br>124,649)                                                            |                 |                         | -                | : SAMP<br>: 04-0<br>: 1.00<br>: 030C<br>: ENVN<br>608.b/                       |
|                                                                                 |                 |                         |                  | ET 320                                                                         |
| (727,648)<br>(727,901)                                                          |                 |                         |                  | 2002 11:<br>:1608-r17<br>:ONG_3327                                             |
| (29,171)                                                                        |                 |                         | ,                | l:55<br>L71.d<br>27RTX                                                         |
| (31,157)<br>(31,653)<br>(32,226)<br>(32,236)<br>(32,331)<br>(33,042)            |                 |                         |                  | 2 11:55<br>3-r171.d<br>_3327RTX5_RAW.m                                         |
| (33,505)                                                                        |                 |                         |                  | -                                                                              |
|                                                                                 | 4 •             |                         |                  |                                                                                |
|                                                                                 |                 |                         |                  |                                                                                |
|                                                                                 | <sup>2</sup> 0: | 107                     |                  |                                                                                |

Lab Sample ID: 502114 Client Sample ID: F01009LS42

Matrix : SOIL Sample Type : SAMPLE

| Peak     | Peak             | Expected | Delta  |                       |                | Extract<br>Conc. |       |                                         |
|----------|------------------|----------|--------|-----------------------|----------------|------------------|-------|-----------------------------------------|
| No.      | RT               | RT       | RT     | Area                  | Height         | (ppb)            | Flags | Peak Identification                     |
| 1        | 0.889            | =======  | ====== | 338916                | 55922          | ========         | ===== | ======================================= |
| 2        | 1.150            |          |        | 58490                 | 7375           |                  |       |                                         |
| 3        | 1.594            |          |        | 2322                  | 282            |                  |       |                                         |
| 4        | 2.913            |          |        | 321                   | 95             |                  |       |                                         |
| 5        | 3.092            |          |        | 886                   | 125            |                  |       |                                         |
| 6        | 3.316            |          |        | 2730                  | 469            |                  |       |                                         |
| 7        | 3.556            |          |        | 1071                  | 211            |                  |       |                                         |
| 8        | 3.771            |          |        | 9827                  | 3476           |                  |       |                                         |
| 9        | 3.868            |          |        | 2037                  | 517            | *                | 5     |                                         |
| 10<br>11 | 4.037            |          |        | 355                   | 104            |                  |       |                                         |
| 12       | 4.396            |          |        | 383<br>4769           | 154            |                  |       |                                         |
| 13       | 4.522            |          |        | 1080                  | 1801<br>316    |                  |       |                                         |
| 14       | 4.693            |          |        | 1794                  | 610            |                  |       |                                         |
| 15       | 4.999            | 5.001    | -0.002 | 291256                | 115494         | 36.6624          |       | Tetrachloro-meta-xylene                 |
| 16       | 5.260            |          |        | 2750                  | 415            | 10               |       | recraemoro-meta-xyrene                  |
| 17       | 5.579            |          |        | 3401                  | 1136           |                  |       |                                         |
| 18       | 5.810            |          |        | 268                   | 72             |                  |       |                                         |
| 19       | 5.865            |          |        | 822                   | 222            |                  |       |                                         |
| 20       | 6.040            |          |        | 569                   | 190            |                  |       |                                         |
| 21       | 6.184            |          |        | 640                   | 175            |                  |       |                                         |
| 22       | 6.333            |          |        | 840                   | 123            |                  |       |                                         |
| 23<br>24 | 7.062<br>7.302   |          |        | 650                   | 121            |                  |       |                                         |
| 25       | 7.765            |          |        | 1073<br>2173          | 163<br>577     |                  |       |                                         |
| 26       | 7.933            | 7.925    | 0.009  | 710                   | 84             | 0.198765         | 2     | BZ#28                                   |
| 27       | 8.312            |          |        | 798                   | 172            | 0.130703         | a     | D2#20                                   |
| 28       | 8.474            |          |        | 713                   | 185            |                  |       |                                         |
| 29       | 8.625            |          |        | 1333                  | 270            |                  |       |                                         |
| 30       | 9.252            |          |        | 2632                  | 474            |                  |       |                                         |
| 31       | 9.696            |          |        | 845                   | 114            |                  |       |                                         |
| 32       | 10.161           |          |        | 1174                  | 170            |                  |       |                                         |
| 33       | 11.471           |          |        | 205                   | 56             |                  |       |                                         |
| 34<br>35 | 11.872           |          |        | 953                   | 150            |                  |       |                                         |
| 36       | 12.438<br>13.774 | 13.752   | 0.022  | 3127                  | 448            |                  |       |                                         |
| 37       | 14.672           | 13.752   | 0.022  | 10294<br>1768         | 660<br>237     | 3.26306          | a     | BZ#77                                   |
| 38       | 15.459           |          |        | 713                   | 127            |                  |       |                                         |
| 39       | 15.654           |          |        | 562                   | 119            |                  |       |                                         |
| 40       | 16.015           |          |        | 1587                  | 169            |                  |       |                                         |
| 41       | 16.304           |          |        | 39578                 | 3230           |                  |       |                                         |
| 42       | 17.317           |          |        | 3681                  | 344            |                  |       |                                         |
| 43       | 18.015           |          |        | 5849                  | 673            |                  |       |                                         |
| 44       | 18.416           |          |        | 4609                  | 231            |                  | ·     |                                         |
| 45       | 19.134           |          |        | 839                   | 143            |                  |       |                                         |
| 46       | 19.784           |          |        | 1064                  | 209            |                  |       |                                         |
| 47<br>48 | 20.447<br>20.777 |          |        | 701                   | 147            |                  |       |                                         |
| 49       | 21.468           |          |        | 2093<br>2 <b>2</b> 47 | 288<br>446     |                  |       |                                         |
| 50       | 21.952           |          |        | 802                   | 141            |                  |       |                                         |
| 51       | 22.277           |          |        | 660                   | 113            |                  |       |                                         |
| 52       | 22.550           | 22.559   | -0.009 | 333212                | 64245          | 43.0422          |       | BZ#198                                  |
| 53       | 23.690           |          |        | 690                   | 107            |                  |       | - ·                                     |
| 54       | 24.649           |          |        | 758                   | 136            |                  |       |                                         |
| 55       | 27.648           |          |        | 2680                  | ~ 319 <b>^</b> | 108              |       |                                         |

|      |         |          |       |         |         | Extract |       |                     |
|------|---------|----------|-------|---------|---------|---------|-------|---------------------|
| Peak | Peak    | Expected | Delta |         |         | Conc.   |       |                     |
| No.  | RT      | RT       | RT    | Area    | Height  | (ppb)   | Flags | Peak Identification |
|      | ======= |          |       | ======= | ======= |         |       |                     |
| 56   | 27.901  |          |       | 1213    | 191     |         |       |                     |
| 57   | 29.171  |          |       | 1290    | 175     |         |       |                     |
| 58   | 31.157  |          |       | 951     | 63      |         |       |                     |
| 59   | 31.632  |          |       | 267     | 65      |         |       |                     |
| 60   | 31.854  |          |       | 825     | 200     |         |       |                     |
| 61   | 32.226  |          |       | 10333   | 1909    |         |       |                     |
| 62   | 32.503  |          |       | 1277    | 248     |         |       |                     |
| 63   | 32.569  |          |       | 1698    | 317     |         |       |                     |
| 64   | 32.791  |          |       | 11597   | 1456    |         |       |                     |
| 65   | 33.042  |          |       | 3852    | 520     |         |       |                     |
| 66   | 33.505  |          |       | 20770   | 3372    |         |       |                     |
| 67   | 34.172  |          |       | 3042    | 274     |         |       |                     |

Flags: A - Peak quantitates above calibration range

- a Peak quantitates below reporting limit
- H User selected alternate compound hit
- $\mbox{\bf M}$  Peak manually integrated or manually identified  $\mbox{\bf R}$  Peak fails recovery
- U User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

#### Target Compounds

| Peak    | Expected |                         |
|---------|----------|-------------------------|
| RT      | RT       | Target Compound         |
| ======= | =======  |                         |
| 4.999   | 5.001    | Tetrachloro-meta-xylene |
|         | 5.761    | BZ#8                    |
|         | 6.701    | BZ#18                   |
| 7.933   | 7.925    | BZ#28                   |
|         | 8.984    | BZ#52                   |
|         | 9.667    | BZ#44                   |
|         | 11.243   | BZ#66                   |
|         | 12.207   | BZ#101                  |
| 13.774  | 13.752   | BZ#77                   |
|         | 14.938   | BZ#118                  |
|         | 15.993   | BZ#153                  |
|         | 16.155   | BZ#105                  |
|         | 17.328   | BZ#138 ·                |
|         | 17.762   | BZ#126                  |
|         | 18.647   | BZ#128                  |
|         | 20.781   | BZ#180                  |
|         | 22.271   | BZ#170                  |
| 22.550  | 22.559   | BZ#198                  |
|         | 24.552   | BZ#195                  |
|         | 27.655   | BZ#206                  |
|         | 29.180   | BZ#209                  |

```
Integrator
Method
                                                                                                                                                                                                                                                                                                                          Instrument
Column
                                                                                                                                                                                                                                                                                                     Reported
                                                                                                                                                                                                                                                                                                                                         Analyst
                                                                                                                                                                                                                                                                                                                                               Matrix
                                                                                                                                                                                                                                                                                                                                                                Lab
                                                                                                                                                                                                                                                                                                                                                              Sample
              (7.570)

(7.570)

(8.331)

(8.2133)

(8.2133)

(9.082)

(9.082)

(9.082)

(9.082)
             13.926)
13.926)
13.8237
14.872
14.872
14.385)
14.773)
                                                                                                                                                                                                                                                                                                                                                               ID:
   6
                                                                                                                                                                                                                                                                                                                          3327_2.i
RTX-CLPII
   #<sub>1</sub>
                                                                                                                                                                                                                                                                                                    17-Oct-2002 09:56
                                                                                                                                                                                                                                                                                                                  Falcon
                                                                                                                                                                                                                                                                                                                                                SOIL
                                                                                                                                                                                                                                                                                                                                                               502114
                                                                                                                                                                                                                                                                                                       var/chem/3327_2.i/100302_1/030CT021608.b/32CONG_3327RTXCLPII_RAW.m
   ₽-
             )8Z#66 (13.012)
)(13.386)
   ta-
             母#:3933
             (15.056)
   16
               (16.450)
(16.723)
    17
                                                                                                                                                                                                                                                                                                    rrm
                                                                                                                                                                                                                                                                                  HultiChrom GC 03oot021608.i171
   18
                                                                                                                                                                                                                                                                                                                               Dilution Factor:
                                                                                                                                                                                                                                                                                                                                      Sample Type
Injection Date
                                                                                                                                                                                                                                                                                                                 Compound Sublist: ENVNET
                                                                                                                                                                                                                                                                                                                         Data File
                                                                                                                                                                                                                                                                                                                                                             Client
               (18.589)
19 20
Time (Hin)
                     <del>>(19,205)</del>
                (BZ#138 (19.686)
5719.994)
6720.192)
                                                                                                                                                                                                                                                                                                                                                            Sample
   12
                BZ#128 (21,451)
                (21.898)
   22-
                1(22.455)
1(22.778)
182#180 (23.091)
    2
                                                                                                                                                                                                                                                                                                                                                             Ħ:
    2
                 <del>122</del>4:3383
                                                                                                                                                                                                                                                                                                                        03oct021608-r171.d
                                                                                                                                                                                                                                                                                                                                       SAMPLE
04-OCT-2002
                                                                                                                                                                                                                                                                                                                                                             F01009LS42
                                                                                                                                                                                                             BZ#198 (24,656)
   8-
   26
                 (26,633)
    27-
   28-
                 (28,001)
(28,305)
                 (28,797)
(29,125)
                                                                                                                                                                                                                                                                                                                                       11:55
    29-
                      (29,792)
    8-
                         30.747)
    μ.
                          (31,479)
   8
                             (32,379)
                            32.8773
25773
    ظ-
   ŭ.
                             (34,077)
                             (34.609)
    a:
                              ≥(35,522)
   8
```

0110

1

0.6-

0.5-

**4** 

&-

39

40 41

Z39,408>

0.7-

.8-

1.0

1.1-

1.2

1.3

1.4

1. 5 Lab Sample ID: 502114 Client Sample ID: F01009LS42

: SOIL Sample Type : SAMPLE

Matrix Analyst Injection Date : 04-OCT-2002 11:55

Analyst : w Instrument : 3327\_2.i Dilution Factor: 1.00

: 03oct021608-r171.d Column : RTX-CLPII Data File

Compound Sublist: ENVNET Integrator : Falcon

Method : /var/chem/3327\_2.i/100302\_1/03OCT021608.b/32CONG\_3327RTXCLPII\_RAW.m Reported : 17-Oct-2002 09:56 rrm

Peaks

| - 1         | m              | <b>5</b>       | D-16-       |             |            | Extract        |       |                         |
|-------------|----------------|----------------|-------------|-------------|------------|----------------|-------|-------------------------|
| Peak<br>No. | Peak<br>RT     | Expected<br>RT | Delta<br>RT | Area        | Height     | Conc.<br>(ppb) | Flags | Peak Identification     |
|             |                | =======        |             | =======     | _          |                | ===== |                         |
| 1           | 0.927          |                |             | 456156      | 57855      |                |       |                         |
| 2           | 1.228          |                |             | 54796       | 7922       |                |       |                         |
| 3           | 1.403          |                |             | 33262       | 3478       |                |       |                         |
| 4           | 1.674          |                |             | 1346        | 273        |                |       |                         |
| 5           | 1.849          |                |             | 2322        | 304        |                |       |                         |
| 6           | 2.212          |                |             | 376<br>494  | 62<br>95   |                |       |                         |
| 7<br>8      | 2.363<br>2.746 |                |             | 517         | 115        |                |       |                         |
| 9           | 2.966          |                |             | 3869        | 402        |                | 8 5   |                         |
| 10          | 3.241          |                |             | 871         | 183        |                |       |                         |
| 11          | 3.367          |                |             | 1497        | 223        |                |       |                         |
| 12          | 3.496          |                |             | 2504        | 505        |                |       |                         |
| 13          | 3.638          |                |             | 3796        | 849        |                |       |                         |
| 14          | 3.773          |                |             | 958         | 267        |                |       |                         |
| 15          | 3.835          |                |             | 2421        | 406        |                |       |                         |
| 16          | 3.992          |                |             | 592         | 219        |                |       |                         |
| 17          | 4.054          |                |             | 16403       | 4792       |                |       |                         |
| 18          | 4.252          |                |             | 6237        | 1052       |                |       |                         |
| 19          | 4.433          |                |             | 2165        | 327        |                |       |                         |
| 20          | 4.595          |                |             | 1216        | 237        |                |       |                         |
| 21          | 4.690          |                |             | 6902        | 2256       |                |       |                         |
| 22          | 4.866          |                |             | 3045<br>281 | 480<br>81  |                |       |                         |
| 23<br>24    | 5.211<br>5.380 | 5.391          | -0.011      | 391668      | 135041     | 35.9325        |       | Tetrachloro-meta-xylene |
| 24<br>25    | 5.575          | 5.391          | -0.011      | 6079        | 1057       | 33.9323        |       | Tetrachioro-meta xyrene |
| 26          | 5.918          |                |             | 623         | 165        | •              |       |                         |
| 27          | 6.020          |                |             | 3697        | 1075       |                |       |                         |
| 28          | 6.249          |                |             | 3782        | 1132       |                |       |                         |
| 29          | 6.495          |                |             | 1796        | 305        |                |       |                         |
| 30          | 6.697          |                |             | 464         | 121        |                |       |                         |
| 31          | 6.847          |                |             | 282         | 84         |                |       |                         |
| 32          | 6.989          |                |             | 454         | 115        |                |       |                         |
| 33          | 7.570          |                |             | 2790        | 345        |                |       |                         |
| 34          | 7.831          |                |             | 208         | 57         |                |       |                         |
| 35          | 8.009          |                |             | 509         | 152        |                |       |                         |
| 36          | 8.213          |                |             | 2228        | 177        |                |       |                         |
| 37          | 8.459          |                |             | 551         | 134        |                |       |                         |
| 38          | 8.559          |                |             | 407<br>886  | 105<br>203 |                |       |                         |
| 39<br>40    | 8.831<br>9.082 |                |             | 896         | 159        |                |       |                         |
| 41          | 9.082          |                |             | 757         | 151        |                |       |                         |
| 41          | 9.534          |                |             | 10059       | 1393       |                |       |                         |
| 43          | 9.926          |                |             | 643         | 104        |                |       |                         |
| 44          | 10.237         |                |             | 1326        | 248        |                |       |                         |
| 45          | 10.381         |                |             | 2036        | 327        |                |       |                         |
| 46          | 10.567         |                |             | 1226        | 172        |                |       |                         |
| 47          | 10.879         |                |             | 1547        | 258        |                |       |                         |
| 48          | 11.046         |                |             | 432         | 95         |                |       |                         |
| 49          | 11.385         |                |             | 7400        | 1081       |                |       |                         |
| 50          | 11.773         |                |             | 847         | 180        |                |       |                         |
| 51          | 12.500         |                |             | 1635        | 233        |                |       |                         |
| 52          | 13.012         | 13.056         | -0.044      | 8259        | 709        | 2.10816        | a     | BZ#66                   |
| 53          | 13.386         |                |             | 10281       | . 930      |                |       |                         |
| 54          | 14.040         |                |             | 27412       | 1986       | 0444           |       |                         |
| 55          | 14.202         |                |             | 15665       | 1442       | 0111           |       |                         |

STL Burlington - Target GC Injection Report

|       |          |          |         |        |        | Extract  |       |                     |
|-------|----------|----------|---------|--------|--------|----------|-------|---------------------|
| Peak  | Peak     | Expected | Delta   |        |        | Conc.    |       |                     |
| No.   | RT       | RT       | RT      | Area   | Height | (ppb)    | Flags | Peak Identification |
| ===== |          |          | ======= |        |        | =======  | ===== |                     |
| 5€    | 14.371   |          |         | 12082  | 1098   |          |       |                     |
| 57    | 15.056   |          |         | 14887  | 988    |          |       |                     |
| 58    | 16.450   |          |         | 812    | 132    |          |       |                     |
| 59    | 16.723   |          |         | 1420   | 186    |          |       |                     |
| 60    | 17.640   |          |         | 989    | 163    |          |       |                     |
| 63    | . 17.973 |          |         | 3421   | 361    |          |       |                     |
| 62    | 18.589   |          |         | 10230  | 737    |          |       |                     |
| 63    | 19.205   |          |         | 49374  | 5071   |          |       |                     |
| 64    | 19.686   | 19.713   | -0.027  | 8309   | 618    | 0.546659 | a     | BZ#138              |
| 65    | 19.994   |          |         | 5303   | 767    |          |       |                     |
| 66    | 20.192   |          |         | 3500   | 366    |          |       |                     |
| 67    | 21.451   | 21.462   | -0.011  | 755    | 129    | 1.03527  | a     | BZ#128              |
| 68    | 21.898   |          |         | 951    | 200    |          |       |                     |
| 69    | 22.455   |          |         | 1019   | 192    |          |       |                     |
| 70    | 22.778   |          |         | 938    | 138    |          |       |                     |
| 71    | 23.091   | 23.115   | -0.024  | 2314   | 365    | 0.604496 | a     | BZ#180              |
| 72    | 24.133   |          |         | 2046   | 452    |          |       |                     |
| 73    | 24.308   |          |         | 2450   | 389    |          |       |                     |
| \$ 74 | 24.656   | 24.678   | -0.022  | 532567 | 97894  | 41.1056  |       | BZ#198              |
| 75    | 26.633   |          |         | 1033   | 157    |          |       |                     |
| 76    | 28.001   |          |         | 764    | 136    |          |       |                     |
| 71    | 28.305   |          |         | 231    | 46     |          |       |                     |
| 78    | 28.797   |          |         | 4060   | 406    |          |       |                     |
| 79    | 29.125   |          |         | 1663   | 57     | _        | 22 W  |                     |
| 80    | 29.792   |          |         | 5888   | 557    |          |       |                     |
| 83    | 30.747   |          |         | 9822   | 313    |          |       |                     |
| 82    | 31.479   |          |         | 3608   | 81     |          |       |                     |
| 83    | 32.379   |          |         | 7500   | 260    |          |       |                     |
| 84    | 32.873   |          |         | 24205  | 2991   |          |       |                     |
| 85    | 33.073   |          |         | 3992   | 650    |          |       |                     |
| 86    |          |          |         | 4194   | 662    |          |       |                     |
| 87    | 34.077   |          |         | 6851   | 626    |          |       |                     |
| 88    | 34.609   |          |         | 19212  | 2248   |          |       |                     |
| 89    | 35.522   |          |         | 8079   | 1394   |          |       |                     |
| 90    | 39.408   |          |         | 805    | 113    |          |       |                     |
|       |          |          |         |        |        |          |       |                     |

- a Peak quantitates below reporting limit
- H User selected alternate compound hit
- M Peak manually integrated or manually identified
- R Peak fails recovery
- ${\tt U}$  User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

Target Compounds

| Dook    | Evenented |                         |
|---------|-----------|-------------------------|
| Peak    | Expected  |                         |
| RT      | RT        | Target Compound         |
| ======= |           |                         |
| 5.380   | 5.391     | Tetrachloro-meta-xylene |
|         | 6.592     | BZ#8                    |
|         | 7.698     | BZ#18                   |
|         | 9.137     | BZ#28                   |
|         | 10.341    | BZ#52                   |
|         | 11.312    | BZ#44                   |
| 13.012  | 13.056    | BZ#66                   |
|         | 13.914    | BZ#101                  |
|         | 16.080    | BZ#77                   |
|         | 17.075    | BZ#118                  |
|         | 17.995    | BZ#153                  |
|         | 18.720    | BZ#105                  |
| 19.686  | 19.713    | BZ#138                  |
|         | 20.225    | BZ#126                  |
| 21.451  | 21.462    | BZ#128                  |
| 23.091  | 23.115    | BZ#180                  |
| 24.656  | 24.678    | BZ#198                  |
|         | 25.004    | BZ#170                  |
|         | 27.203    | BZ#195                  |
|         | 29.805    | Bz#206 0112             |

| Peak | Expected |                                         |
|------|----------|-----------------------------------------|
| RT   | RT       | Target Compound                         |
|      |          | ======================================= |
|      | 30.754   | BZ#209                                  |

## FORM 1 OTHER ORGANICS ANALYSIS DATA SHEET

ENVNET SAMPLE NO.

F01009LS43

Lab Name: STL BURLINGTON

Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.:

SDG No.: 89891

Matrix: (soil/water) SOIL

Lab Sample ID: 502113

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: 030CT021608-R161

% Moisture: 32 decanted: (Y/N) N Date Received: 09/25/02

Extraction: (SepF/Cont/Sonc) SOXH

Date Extracted: 09/26/02

Concentrated Extract Volume: 10(mL) Date Analyzed: 10/04/02

Injection Volume: 1.0(uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: \_\_\_

Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS:

CAS NO. COMPOUND

(ug/L or ug/Kg) UG/KG

|                  | •           |     |     |  |
|------------------|-------------|-----|-----|--|
| 24002 42 7       |             |     |     |  |
| 34883-43-7BZ#8   |             | 2.4 | I - |  |
| 37680-65-2BZ#18  |             | 2.4 | U   |  |
| 7012-37-5BZ#28   |             | 2.4 | U   |  |
| 41464-39-5BZ#44  |             | 2.4 | U   |  |
| 35693-99-3BZ#52  |             | 2.4 | U   |  |
| 32598-10-0BZ#66  |             | 2.4 | Ū   |  |
| 32598-13-3BZ#77  |             | 2.4 |     |  |
| 37680-73-2BZ#101 |             | 2.4 |     |  |
| 32598-14-4BZ#105 |             | 2.4 |     |  |
| 31508-00-6BZ#118 |             | 2.4 | 1   |  |
| 57465-28-8BZ#126 |             | 2.4 |     |  |
| 38380-07-3BZ#128 |             |     |     |  |
| 35065-28-2BZ#138 |             |     |     |  |
|                  |             | 2.4 |     |  |
| 35065-27-1BZ#153 |             | 2.4 |     |  |
| 35065-30-6BZ#170 |             | 1   | _   |  |
| 35065-29-3BZ#180 |             | 2.4 | U   |  |
| 52663-68-0BZ#187 |             | 2.4 | U   |  |
| 52663-78-2BZ#195 |             | 2.4 | U   |  |
| 40186-72-9BZ#206 |             | 2.4 |     |  |
| 2051-24-3BZ#209  |             |     |     |  |
| Di               |             |     | 9   |  |
|                  | <del></del> |     |     |  |

| (1,204)                                                                  | (0,891) |     |                  |    |                             |                                                                                |
|--------------------------------------------------------------------------|---------|-----|------------------|----|-----------------------------|--------------------------------------------------------------------------------|
| (1.665)<br>(1.665)                                                       |         |     |                  |    |                             |                                                                                |
| 行: 866<br>(3.318)<br>(3.318)<br>(3.568)<br>(3.771)<br>(3.386)<br>(3.386) |         |     |                  |    |                             |                                                                                |
| €5,234)<br>E(5,592)<br>\$\$,85\$}<br>\$\$,337)                           |         |     |                  |    | <del>-Hylane (4,99</del> 9) |                                                                                |
| 17,058)<br>17,399)<br>17,399)<br>17,057)<br>18,317)<br>18,607)           |         |     |                  |    |                             | Matrix Analyst Instrument Column Integrator Method Reported                    |
| 5(9,257)<br>13:702)<br>410.336)                                          |         |     |                  |    |                             |                                                                                |
| Ŧ                                                                        |         |     |                  |    |                             | SOIL 3327_1 RTX-5 Falcon /var/c 17-Oct                                         |
| X12.440>                                                                 |         |     |                  |    |                             | 7_1.<br>-5<br>con<br>con<br>r/ch                                               |
| )<br>(±13.825)                                                           |         |     |                  |    |                             | SOIL 3327_1.i RTX-5 Falcon /var/chem/3327 17-Oct-2002 09                       |
| (16,004)<br>>(16,310)                                                    |         |     |                  |    |                             | 327_1.<br>09:45                                                                |
| <u>(1</u> 7,317)                                                         |         |     |                  |    |                             | , <del>L</del> .                                                               |
| 2(18,017)<br>(48,421)<br>(18,633)                                        |         |     |                  |    | ·                           | Sample Inject Diluti Data F Compou /100302                                     |
| (19.143)<br>(13.9.788)                                                   |         |     |                  |    |                             |                                                                                |
| T20,449)<br>(20,781)                                                     |         |     |                  |    |                             | Tynion ion ile ile ile ile ile ile ile ile ile ile                             |
| (21.956)                                                                 |         | -   | —BZ#198 (22.552) |    |                             | pe<br>Date<br>Facto<br>Subl:<br>30CT                                           |
| 123,384)                                                                 |         |     |                  |    |                             | or<br>or<br>021                                                                |
| (24,401)                                                                 |         |     |                  | •  |                             | 0                                                                              |
|                                                                          |         |     |                  |    |                             | SAMPLE 04-OCT-2002 11:10 1.00 03oct021608-r161.d ENVNET 08.b/32CONG_3327RTX    |
|                                                                          |         |     |                  |    |                             | LE<br>CT-<br>t02<br>ET<br>320                                                  |
|                                                                          |         |     |                  |    |                             | 2002<br>21608<br>20NG_                                                         |
| T27,651)<br>T27,912)<br>T28,351)                                         |         |     |                  |    |                             | 02<br>08-                                                                      |
| (28.845)<br>((29.171)                                                    |         |     |                  |    |                             | 11<br>r1                                                                       |
| ===                                                                      |         |     |                  |    |                             | 11:10<br>r161.<br>327RT                                                        |
| (30,515)                                                                 |         |     |                  |    |                             | .d                                                                             |
| 134:1583                                                                 |         |     |                  |    |                             | لع ا                                                                           |
| 132.233<br>133.785<br>133.507)                                           |         |     |                  |    |                             | PLE<br>OCT-2002 11:10<br>0<br>ct021608-r161.d<br>NET<br>/32CONG_3327RTX5_RAW.m |
| (34.177)                                                                 |         |     |                  |    |                             |                                                                                |
| (35.272)                                                                 |         |     |                  |    |                             |                                                                                |
|                                                                          |         | ! ◀ |                  |    |                             | <u> </u>                                                                       |
|                                                                          |         |     |                  |    |                             |                                                                                |
|                                                                          |         |     | 8                |    |                             |                                                                                |
|                                                                          |         |     | 01               | 15 |                             |                                                                                |

Lab Sample ID: 502113 Client Sample ID: F01009LS43

Matrix : SOIL Sample Type : SAMPLE

Analyst : Injection Date : 04-OCT-2002 11:10

Instrument : 3327\_1.i Dilution Factor : 1.00

Column : RTX-5 Data File : 03oct021608-r161.d

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_1.i/100302\_1/03OCT021608.b/32CONG\_3327RTX5\_RAW.m

Peaks

Reported : 17-Oct-2002 09:45 rrm

|             |                  |          |        |                                        | P          | eaks           |        |                         |
|-------------|------------------|----------|--------|----------------------------------------|------------|----------------|--------|-------------------------|
|             |                  |          |        |                                        |            | - I            |        |                         |
| Peak        | Peak             | Expected | Delta  |                                        |            | Extract        |        |                         |
| No.         | RT               | RT       | RT     | Area                                   | Height     | Conc.<br>(ppb) | E3 200 | Deale value (5)         |
|             | ******           |          | KI     | ###################################### | =======    |                | Flags  | Peak Identification     |
| 1           |                  |          |        | 273749                                 | 42731      |                |        |                         |
| 2           |                  |          |        | 90838                                  | 7737       |                |        |                         |
| 3           | 1.665            |          |        | 3043                                   | 429        |                |        |                         |
| 4           | 1.871            |          |        | 320                                    | 71         |                |        |                         |
| 5           | 2.917            |          |        | 547                                    | 137        |                |        |                         |
| 6           |                  |          |        | 1029                                   | 209        |                |        |                         |
| 7           | 3.318            |          |        | 3191                                   | 563        |                |        |                         |
| 8           | 3.560            |          |        | 1295                                   | 242        |                |        |                         |
| 9           |                  |          |        | 11839                                  | 3849       | ••             | 858    |                         |
| 10          |                  |          |        | 311                                    | 110        |                |        |                         |
| 11          |                  |          |        | 467                                    | 167        |                |        |                         |
| 12          |                  |          |        | 6678                                   | 2519       |                |        |                         |
| 13          |                  |          |        | 300                                    | 117        |                |        |                         |
| 14<br>\$ 15 |                  | F 001    | 0.000  | 2248                                   | 695        |                |        |                         |
| \$ 15<br>16 |                  | 5.001    | -0.002 | 321524                                 | 127124     | 40.3430        |        | Tetrachloro-meta-xylene |
| 17          |                  |          |        | 2827                                   | 331        |                |        |                         |
| 18          | 5.865            |          |        | 4265<br>479                            | 1302       |                |        |                         |
| 19          | 6.038            |          |        | 451                                    | 128<br>156 |                |        |                         |
| 20          | 6.337            |          |        | 389                                    | 99         |                |        |                         |
| 21          | 7.058            |          |        | 1303                                   | 227        |                |        |                         |
| 22          |                  |          |        | 715                                    | 173        |                |        |                         |
| 23          | 7.397            |          |        | 662                                    | 232        |                |        |                         |
| 24          | 7.767            |          |        | 1678                                   | 433        |                |        |                         |
| 25          | 7.949            | 7.925    | 0.024  | 391                                    | . 80       | 0.195732       | а      | BZ#28                   |
| 26          | 8.317            |          |        | 278                                    | 88         |                | _      | 22,120                  |
| 27          |                  |          |        | 481                                    | 144        |                |        |                         |
| 28          | 9.257            |          |        | 5609                                   | 1166       |                |        |                         |
| 29          | 9.472            |          |        | 997                                    | 166        |                |        |                         |
| 30          | 9.702            |          |        | 1040                                   | 142        |                |        |                         |
| 31          | 10.336           |          |        | 291                                    | 35         |                |        |                         |
| 32          | 12.440           |          |        | 4906                                   | 649        |                |        |                         |
| 33          | 13.825           |          |        | 19396                                  | 1122       |                |        |                         |
| 34          | 16.004           |          |        | 1135                                   | 137        |                |        |                         |
| 35          | 16.310           |          |        | 30187                                  | 2529       |                |        |                         |
| 36          | 17.317           |          |        | 1725                                   | 195        |                |        |                         |
| 37          | 18.017           |          |        | 7223                                   | 810        |                |        |                         |
| 38          | 18.421           |          |        | 4580                                   | 123        |                |        |                         |
| 39          | 18.633           |          |        | 603                                    | 118        |                |        |                         |
| 40<br>41    | 19.143           |          |        | 783                                    | 136        |                |        |                         |
| 41          | 19.788<br>20.449 |          |        | 1428                                   | 246        |                |        |                         |
| 42          | 20.449           |          |        | 878                                    | 169        |                |        |                         |
| 44          | 21.956           |          |        | 2580<br>790                            | 264<br>135 |                |        |                         |
| \$ 45       |                  | 22.559   | -0.007 | 790<br>348988                          | 67573      | 4E 3576        |        | D7#3.00                 |
| ₹ 45<br>46  |                  | 22.333   | -0.007 | 1129                                   | 177        | 45.3576        |        | BZ#198                  |
| 47          | 24.401           |          |        | 838                                    | 141        |                |        |                         |
| 48          | 27.651           |          |        | 1727                                   | 192        |                |        |                         |
| 49          | 27.912           |          |        | 440                                    | 65         |                |        |                         |
| 50          | 28.351           |          |        | 582                                    | 111        |                |        |                         |
| 51          |                  |          |        | 2773                                   | 145        |                |        |                         |
| 52          |                  |          |        | 3676                                   | 315        |                |        |                         |
| 53          |                  |          |        | 1311                                   | 9          |                |        |                         |
| 54          | 31.151           |          |        | 1179                                   | 103        |                |        |                         |
|             |                  |          |        |                                        |            |                |        |                         |
| 55          | 31.328           |          |        | 252                                    | 44 6       | )116           |        |                         |

|      |         |          |         |       |        | Extract |       |      |                |
|------|---------|----------|---------|-------|--------|---------|-------|------|----------------|
| Peak | Peak    | Expected | Delta   |       |        | Conc.   |       |      |                |
| No.  | RT      | RT       | RT      | Area  | Height | (ppb)   | Flags | Peak | Identification |
|      | ======= |          | ======= |       |        |         | ===== |      |                |
| 56   | 32.233  |          |         | 3572  | 340    |         |       |      |                |
| 57   | 32.403  |          |         | 1389  | 190    |         |       |      |                |
| 58   | 32.583  |          |         | 1333  | 283    |         |       |      |                |
| 59   | 32.793  |          |         | 8954  | 885    |         |       | 5.75 |                |
| 60   | 33.015  |          |         | 2928  | 446    |         |       |      |                |
| 61   | 33.155  |          |         | 4523  | 555    |         |       |      |                |
| 62   | 33.507  |          |         | 14783 | 2085   |         |       |      |                |
| 63   | 34.177  |          |         | 2764  | 259    |         |       |      |                |
| 64   | 35.272  |          |         | 436   | 102    |         |       |      |                |

- a Peak quantitates below reporting limit
- H User selected alternate compound hit
- M Peak manually integrated or manually identified
- R Peak fails recovery
- U User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

| Target | Compounds |
|--------|-----------|
| iaruet | Compounds |

| Peak<br>RT | Expected<br>RT | Targęt Compound         |
|------------|----------------|-------------------------|
|            |                |                         |
| 4.999      | 5.001          | Tetrachloro-meta-xylene |
|            | 5.761          | BZ#8                    |
|            | 6.701          | BZ#18                   |
| 7.949      | 7.925          | BZ#28                   |
|            | 8.984          | BZ#52                   |
|            | 9.667          | BZ#44                   |
|            | 11.243         | BZ#66                   |
|            | 12.207         | BZ#101                  |
|            | 13.752         | BZ#77                   |
|            | 14.938         | BZ#118                  |
|            | 15.993         | BZ#153                  |
|            | 16.155         | BZ#105                  |
|            | 17.328         | BZ#138                  |
|            | 17.762         | BZ#126                  |
|            | 18.647         | BZ#128                  |
|            | 20.781         | BZ#180 ·                |
|            | 22.271         | BZ#170                  |
| 22.552     | 22.559         | BZ#198                  |
|            | 24.552         | BZ#195                  |
|            | 27.655         | BZ#206                  |
|            | 29.180         | BZ#209                  |

```
(1,248)
             (1.831)
   N-
   on-
                                                                                                                                                                                                                                                                                    Column
                                                                                                                                                                                                                                                                                                                     Lab
                                                                                                                                                                                                                                                                 Reported
                                                                                                                                                                                                                                                                       Method
                                                                                                                                                                                                                                                                            Integrator
                                                                                                                                                                                                                                                                                           Instrument
                                                                                                                                                                                                                                                                                                 Analyst
                                                                                                                                                                                                                                                                                                       Matrix
             2493
            (6.610)
(6.991)
                                                                                                                                                                                                                                                                                                                   Sample
            28:243}
            (8.561)
             <del>(9</del>,086)
             ₹9,536>
                                                                                                                                                                                                                                                                                                                     IJ:
            (3,951)
   6
             120.385)
                                                                                                                                                                                                                                                                                    3327_2.i
RTX-CLPII
            440.9392
                                                                                                                                                                                                                                                                                                       SOIL
                                                                                                                                                                                                                                                               /var/chem/3327_2.i/100302_1/030CT021608.b/32CONG_3327RTXCLPII_RAW.m
17-Oct-2002 09:56 rrm
                                                                                                                                                                                                                                                                              Falcon
                                                                                                                                                                                                                                                                                                                    502113
             (11.387)
   12-
           DEZ#66 (13.010)
   13
   4
          Qc14.218)
   13
   16
              (16.457)
   17
                                                                                                                                                                                                                                                                           Sample Type : SAMPLE
Injection Date : 04-OCT-2
Dilution Factor : 1.00
Data File : 03oct021
Compound Sublist: ENVNET
                                                                                                                                                                                                                                                  HultiChrom GC 03oct021608.i161
   #
             (17,971)
                                                                                                                                                                                                                                                                                                                   Client
             (18.598)
19 20
Time (Hi
                 >(19,207)
             182#138 (19,682)
1120:196)
                                                                                                                                                                                                                                                                                                                  Sample
  <u>'يا</u>
               EZ#128 (21.453)
              (221,901)
   8
              T22.457)
T22.781)
EZ#180 (23.082)
   23-
                                                                                                                                                                                                                                                                                                                   Ħ:
   2
               (24,308)
                                                                                                                                                                                                                                                                                  03oct021608-r161.d
                                                                                                                                                                                                                                                                                               SAMPLE
04-OCT-2002
                                                                                                                                                                                                                                                                                                                  F01009LS43
                                                                                                                                                                                             -BZ#198 (24,658)
   23
               (25.844)
   8.
               (26.385)
(26.635)
   27
   8
               (27,992)
(28,311)
               (28,803)
   3-
                   29,803)
   ų-
ا
                      30,752)
  원
                       (31,501)
   띯-
                         (32,386)
                        (33,878)
(33,279)
(33,687)
(34,041)
   ద-
   烁.
                         (34,609)
   띯
                          <del>(735, 328</del>)
   띯
```

0118

Y (x10^5)

0.9-

-(0.927)

0-

37 38 39

40 41

(39,403)

1.0-

1.1-

1.2-

. . . \*

1.5-

1.3-

Lab Sample ID: 502113 Client Sample ID: F01009LS43

Matrix : SOIL

Sample Type : SAMPLE
Injection Date : 04-OCT-2002 11:10 

Dilution Factor : 1.00

Column : RTX-CLPII Data File : 03oct021608-r161.d

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_2.i/100302\_1/03OCT021608.b/32CONG\_3327RTXCLPII\_RAW.m Reported : 17-Oct-2002 09:56 rrm

| Peak     | Peak             | Expected | Delta   |             |                   | Extract<br>Conc. |       |                         |
|----------|------------------|----------|---------|-------------|-------------------|------------------|-------|-------------------------|
| No.      | RT               | RT       | RT      | Area        | Height            | (ppb)            | Flags | Peak Identification     |
| 1        | 0.022            | =======  | ======= | =======     |                   | ========         | ====  |                         |
| 1<br>2   | 0.927<br>1.248   |          |         | 362919      | 43840             |                  |       |                         |
| 3        | 1.831            |          |         | 131974      | 11781             |                  |       |                         |
| 4        | 3.239            |          |         | 4562<br>854 | 533<br>223        |                  |       |                         |
| 5        | 3.420            |          |         | 1094        | 206               |                  |       |                         |
| 6        | 3.496            |          |         | 1779        | 493               |                  |       |                         |
| 7        | 3.768            |          |         | 718         | 232               |                  |       |                         |
| 8        | 3.835            |          |         | 1435        | 345               |                  |       |                         |
| 9        | 3.992            |          |         | 291         | 121               | •                | 3 3   |                         |
| 10       | 4.054            |          |         | 16563       | 5147              |                  |       |                         |
| 11       | 4.256            |          |         | 2180        | 319               |                  |       |                         |
| 12       | 4.431            |          |         | 1269        | 189               |                  |       |                         |
| 13       | 4.591            |          |         | 1333        | 289               |                  |       |                         |
| 14       | 4.690            |          |         | 9220        | 3143              |                  |       |                         |
| 15       | 4.961            |          |         | 1392        | 207               |                  |       |                         |
| 16       | 5.216            |          |         | 427         | 103               |                  |       |                         |
| 17       | 5.382            | 5.391    | -0.009  | 435429      | 148679            | 39.4974          |       | Tetrachloro-meta-xylene |
| 18       | 5.573            |          |         | 7018        | 1243              |                  |       | •                       |
| 19       | 5.916            |          |         | 1683        | 253               |                  |       |                         |
| 20       | 6.020            |          |         | 4969        | 1224              |                  |       |                         |
| 21       | 6.249            |          |         | 4360        | 1259              |                  |       |                         |
| 22       | 6.610            |          |         | 861         | 167               |                  |       |                         |
| 23<br>24 | 6.991            |          |         | 226         | 59                |                  |       |                         |
| 25       | 7.565<br>8.013   |          |         | 831         | 90                |                  |       |                         |
| 26       | 8.197            |          |         | 507         | 132               | •                |       |                         |
| 27       | 8.561            |          |         | 563<br>2046 | 105               |                  |       |                         |
| 28       | 9.086            |          |         | 1096        | 300<br>216        |                  |       |                         |
| 29       | 9.536            |          |         | 5083        | 946               |                  |       |                         |
| 30       | 9.951            |          |         | 753         | 75                |                  |       |                         |
| 31       | 10.385           |          |         | 1038        | 191               |                  |       |                         |
| 32       | 10.939           |          |         | 842         | 92                |                  |       |                         |
| 33       | 11.387           |          |         | 16741       | 2863              |                  |       |                         |
| 34       | 13.010           | 13.056   | -0.047  | 4589        | 618               | 2.05309          | a     | BZ#66                   |
| 35       | 13.384           |          |         | 6727        | 586               |                  | _     | 52,700                  |
| 36       | 14.218           |          |         | 38857       | 1198              |                  |       |                         |
| 37       | 16.457           |          |         | 631         | 120               |                  |       |                         |
| 38       | 17.971           |          |         | 4066        | 358               |                  |       |                         |
| 39       | 18.598           |          |         | 7629        | 483               |                  |       |                         |
| 40       | 19.207           |          |         | 41054       | 4136              |                  |       |                         |
| 41       | 19.682           | 19.713   | -0.031  | 9180        | 613               | 0.544180         | a     | BZ#138                  |
| 42       | 19.994           |          |         | 5331        | 766               |                  |       |                         |
| 43       | 20.196           |          |         | 3040        | 355               |                  |       |                         |
| 44       | 21.453           | 21.462   | -0.009  | 634         | 109               | 1.02648          | a     | BZ#128                  |
| 45       | 21.901           |          |         | 1260        | 227               |                  |       |                         |
| 46       | 22.457           |          |         | 1162        | 215               |                  |       |                         |
| 47       | 22.781           | 22 115   | 0.000   | 1177        | 165               |                  |       |                         |
| 48       | 23.082<br>24.308 | 23.115   | -0.033  | 1122        | 213               | 0.537602         | a     | BZ#180                  |
| 49<br>50 | 24.308           | 24 670   | 0.000   | 2304        | 374               |                  |       |                         |
| 50<br>51 | 25.844           | 24.678   | -0.020  | 560450      | 102851            | 43.1951          |       | BZ#198                  |
| 52       | 26.385           |          |         | 952         | 135               |                  |       |                         |
| 53       | 26.635           |          |         | 886<br>1235 | 151<br>171        |                  |       |                         |
| 54       | 27.992           |          |         | 933         | 146               |                  |       |                         |
| 55       | 28.311           |          |         | 278         | ~ ~ ~ ~ ^ ~ ^ ~ ^ | 119              |       |                         |

STL Burlington - Target GC Injection Report

|       |        |          |         |       |        | Extract |       |                                         |             |
|-------|--------|----------|---------|-------|--------|---------|-------|-----------------------------------------|-------------|
| Peak  | Peak   | Expected | Delta   |       |        | Conc.   |       |                                         |             |
| No.   | RT     | RT       | RT      | Area  | Height | (dqq)   | Flags | Peak Ide                                | ntification |
| ===== | ====== |          | ======= |       |        |         |       | ======================================= |             |
| 56    | 28.803 |          |         | 3452  | 358    |         |       |                                         |             |
| 57    | 29.109 |          |         | 1603  | 125    |         |       |                                         |             |
| 58    | 29.803 |          |         | 4634  | 328    |         |       |                                         |             |
| 59    | 30.752 |          |         | 8724  | 234    |         |       |                                         |             |
| 60    | 31.501 |          |         | 3832  | 33     |         |       |                                         |             |
| 61    | 32.386 |          |         | 6127  | 179    |         |       |                                         |             |
| 62    | 32.878 |          |         | 9210  | 668    |         |       |                                         |             |
| 63    | 33.000 |          |         | 1856  | 405    |         |       |                                         |             |
| 64    | 33.279 |          |         | 2675  | 457    |         |       |                                         |             |
| 65    | 33.687 |          |         | 8619  | 541    |         |       |                                         |             |
| 66    | 34.041 |          |         | 6346  | 582    |         |       |                                         |             |
| 67    | 34.609 |          |         | 11660 | 1402   |         |       |                                         |             |
| 68    | 35.398 |          |         | 1964  | 291    |         |       |                                         |             |
| 69    | 35.520 |          |         | 4344  | 710    |         |       |                                         |             |
| 70    | 39.403 |          |         | 1534  | 159    |         |       |                                         |             |
|       |        |          |         |       |        |         |       |                                         |             |

Flags: A - Peak quantitates above calibration range

- a Peak quantitates below reporting limit
- H User selected alternate compound hit
- M Peak manually integrated or manually identified
- R Peak fails recovery
- U User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

Target Compounds

| Peak   | Expected |                         |
|--------|----------|-------------------------|
| RT     | RT       | Target Compound         |
|        |          |                         |
| 5.382  | 5.391    | Tetrachloro-meta-xylene |
|        | 6.592    | BZ#8                    |
|        | 7.698    | BZ#18                   |
|        | 9.137    | BZ#28                   |
|        | 10.341   | BZ#52                   |
|        | 11.312   | BZ#44                   |
| 13.010 | 13.056   | BZ#66                   |
|        | 13.914   | BZ#101                  |
|        | 16.080   | BZ#77                   |
|        | 17.075   | BZ#118                  |
|        | 17.995   | BZ#153                  |
|        | 18.720   | BZ#105                  |
| 19.682 | 19.713   | BZ#138                  |
|        | 20.225   | BZ#126                  |
| 21.453 | 21.462   | BZ#128                  |
| 23.082 | 23.115   | BZ#180                  |
| 24.658 | 24.678   | BZ#198                  |
|        | 25.004   | BZ#170                  |
|        | 27.203   | BZ#195                  |
|        | 29.805   | BZ#206                  |
|        | 30.754   | BZ#209                  |
|        |          |                         |

### FORM 1 OTHER ORGANICS ANALYSIS DATA SHEET

ENVNET SAMPLE NO.

F01009LS51

Lab Name: STL BURLINGTON

Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.:

SDG No.: 89891

Matrix: (soil/water) SOIL

Lab Sample ID: 502118

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: 030CT021608-R211

% Moisture: 38 decanted: (Y/N) N

Date Received: 09/25/02

Extraction: (SepF/Cont/Sonc) SOXH

Date Extracted: 09/26/02

Concentrated Extract Volume: 10 (mL)

Date Analyzed: 10/04/02

Injection Volume: 1.0(uL)

GPC Cleanup: (Y/N) N pH: \_\_\_

Dilution Factor: 1.0

Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG 0

|                  | - 4 A |  |
|------------------|-------|--|
| 34883-43-7BZ#8   | 2.7 U |  |
| 37680-65-2BZ#18  | 2.7 U |  |
| 7012-37-5BZ#28   | 2.7 U |  |
| 41464-39-5BZ#44  | 2.7 U |  |
| 35693-99-3BZ#52  | 2.7 U |  |
| 32598-10-0BZ#66  | 2.7 U |  |
| 32598-13-3BZ#77  | 2.7 U |  |
| 37680-73-2BZ#101 | 2.7 U |  |
| 32598-14-4BZ#105 | 2.7 U |  |
| 31508-00-6BZ#118 |       |  |
| 57465-28-8BZ#126 | 2.7 U |  |
| 38380-07-3BZ#128 | 2.7 U |  |
| 35065-28-2BZ#138 | 2.7 U |  |
| 35065-27-1BZ#153 | 2.7 U |  |
| 35065-30-6BZ#170 | 2.7 U |  |
| 35065-29-3BZ#180 |       |  |
| 52663-68-0BZ#187 | 2.7 U |  |
| 52663-78-2BZ#195 | 2.7 U |  |
|                  | 2.7 U |  |
| 40186-72-9BZ#206 | 2.7 U |  |
| 2051-24-3BZ#209  | 2.7 U |  |
|                  |       |  |

Integrator Method

Data File : 03oct021608-r211.d Falcon Compound Sublist: ENVNET /var/chem/3327\_1.i/100302\_1/03OCT021608.b/32CONG\_3327RTX5\_RAW.m 17-Oct-2002 09:45 rrm

Sample Type : SAMPI Injection Date : 04-00 Dilution Factor : 1.00 Data File : 03oct

Column

Instrument

3327\_1.i RTX-5

Reported

Matrix Analyst

Lab Sample

ID:

502118

Client Sample

ID: F01009LS51

: SAMPLE

04-OCT-2002 14:56

|                                                 | o. 6    | 0.8- | •• | 1.0             | 1.2       |                         |                        |
|-------------------------------------------------|---------|------|----|-----------------|-----------|-------------------------|------------------------|
| (?,8 <u>??</u> )                                | (1,215) |      |    |                 |           |                         |                        |
| (1.860)<br>(2.238)                              |         |      |    |                 |           |                         |                        |
| [2:55]<br>≥(2:26)                               |         |      |    |                 |           |                         |                        |
| 3,587(3,726)                                    |         |      |    |                 |           |                         |                        |
| ₹4.693)                                         |         |      |    |                 |           |                         |                        |
| <del>/(5,171)</del><br>≅(5,579)                 |         |      | •  |                 | Tetrachie | <del>ro-neta-ınjl</del> | e <del>ne (4,9</del> 1 |
| 3.89)<br>(6.358)                                |         |      |    |                 |           |                         |                        |
| <u>r(</u> 7,033)<br><del>F(</del> 7,033)        |         |      |    |                 |           |                         |                        |
| 72.763}<br>************************************ |         |      |    |                 |           |                         |                        |
| 13 (13 (13 (13 (13 (13 (13 (13 (13 (13 (        |         |      |    |                 |           |                         |                        |
| ∑9,252)<br><del>(</del> 19,640)                 |         |      |    |                 |           |                         |                        |
| <u>57</u> 10,334)                               |         |      |    |                 |           |                         |                        |
| T11 .604)                                       |         |      |    |                 |           |                         |                        |
| 11:68€}<br>21:435)                              |         |      |    |                 |           |                         |                        |
|                                                 |         |      |    |                 |           |                         |                        |
| )_<br>BZ#77 (13.783)                            |         |      |    |                 |           |                         |                        |
| <u>2</u> 14.626)                                |         |      |    |                 | Arau s    |                         |                        |
|                                                 |         |      |    |                 |           |                         |                        |
| (16,009)                                        |         |      |    |                 |           |                         |                        |
| (17,312)                                        |         |      |    |                 |           |                         | ٠                      |
| T18.010)                                        |         |      |    |                 |           |                         |                        |
| H3:343}                                         |         |      |    |                 |           |                         |                        |
| (19.786)                                        |         |      |    |                 |           |                         |                        |
| (20,444)<br>(120,770)                           |         |      |    |                 |           |                         |                        |
| (21,462)                                        |         |      |    |                 |           |                         |                        |
| (21.947)                                        |         |      |    | BZ#198 (22,546) |           |                         |                        |
| 5(23.375)                                       |         |      |    |                 |           |                         |                        |
|                                                 |         |      |    |                 | •         |                         |                        |
| (24.645)<br>(25.252)                            |         |      |    |                 |           |                         |                        |
| (25.682)<br>(25.975)                            |         |      |    |                 |           |                         |                        |
|                                                 |         |      |    |                 |           |                         |                        |
| (27,653)<br>[22,653]                            |         |      |    |                 |           |                         |                        |
| 126:0631<br>128:3333<br>128:828)                |         |      |    |                 |           |                         |                        |
| (29,111)                                        |         |      |    |                 |           |                         |                        |
| (30,526)                                        |         |      |    |                 |           |                         |                        |
| Γ                                               |         |      | 9  |                 |           |                         |                        |
| 131333                                          |         |      |    |                 |           |                         |                        |
| £32,585)                                        |         |      |    |                 |           |                         |                        |
| (33.507)<br>(33.822)                            |         |      |    |                 |           |                         |                        |
| 5(34.702)                                       |         |      |    |                 |           |                         |                        |
| 135:431)<br>135:421)                            |         |      |    |                 |           |                         |                        |
|                                                 |         |      |    |                 |           |                         |                        |
| 136:946)<br>137.072)                            |         |      | 1  |                 |           |                         |                        |
| (37.852)                                        |         |      |    |                 |           |                         |                        |
|                                                 |         |      |    |                 |           |                         |                        |
| (69)                                            |         |      |    | ~ ~ n           | 122       |                         |                        |
| 8 L                                             |         |      |    |                 | 1//       |                         |                        |

Lab Sample ID: 502118 Client Sample ID: F01009LS51

Matrix : SOIL Sample Type : SAMPLE

Injection Date : 04-OCT-2002 14:56 Analyst

Analyst : WM Instrument : 3327\_1.i Dilution Factor: 1.00

Column : RTX-5 : 03oct021608-r211.d Data File

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_1.i/100302\_1/030CT021608.b/32CONG\_3327RTX5\_RAW.m Reported : 17-Oct-2002\_09:45\_rrm

|          |                  |          |        |                |              | Putus            |       |                                         |
|----------|------------------|----------|--------|----------------|--------------|------------------|-------|-----------------------------------------|
| Peak     | Peak             | Expected | Delta  |                |              | Extract<br>Conc. |       |                                         |
| No.      | RT               | RT       | RT     | Area           | Height       | (ppb)            | Flags | Peak Identification                     |
| 1        | 0.900            | 33325055 |        | 53293          | 8952         |                  | *==== | ======================================= |
| 2        | 1.011            |          |        | 59116          | 8720         |                  |       |                                         |
| 3        | 1.215            |          |        | 218354         | 27561        |                  |       |                                         |
| 4        | 1.860            |          |        | 2907           | 520          |                  |       |                                         |
| 5        | 2.099            |          |        | 314            | 107          |                  |       |                                         |
| 6        | 2.248            |          |        | 6772           | 1220         |                  |       |                                         |
| 7        | 2.465            |          |        | 759            | 147          |                  |       |                                         |
| 8        | 2.594            |          |        | 1851           | 245          |                  | ac e  |                                         |
| 9        | 2.926            |          |        | 10893          | 2640         |                  |       |                                         |
| 10<br>11 | 3.088<br>3.272   |          |        | 14675<br>22581 | 3281<br>3844 |                  |       |                                         |
| 12       | 3.409            |          |        | 8315           | 1693         |                  |       |                                         |
| 13       | 3.587            |          |        | 6258           | 1388         |                  |       |                                         |
| 14       | 3.726            |          |        | 28848          | 6899         |                  |       |                                         |
| 15       | 3.910            |          |        | 21969          | 7246         |                  |       |                                         |
| 16       | 3.966            |          |        | 20039          | 6635         |                  |       |                                         |
| 17       | 4.061            |          |        | 17536          | 3902         |                  |       |                                         |
| 18       | 4.198            |          |        | 2198           | 865          |                  |       |                                         |
| 19       | 4.265            |          |        | 10604          | 2472         |                  |       |                                         |
| 20       | 4.396            |          |        | 7041           | 2162         |                  |       |                                         |
| 21       | 4.693            |          |        | 2185           | 595          |                  |       |                                         |
| 22       | 4.999            | 5.001    | -0.002 | 343599         | 137010       | 43.4716          |       | Tetrachloro-meta-xylene                 |
| 23       | 5.171            |          |        | 6193           | 679          |                  |       |                                         |
| 24       | 5.579            |          |        | 4464           | 1444         |                  |       |                                         |
| 25       | 5.810            |          |        | 234            | 86           | •                |       |                                         |
| 26       | 5.868            |          |        | 965            | 258          |                  |       |                                         |
| 27<br>28 | 6.038<br>6.335   |          |        | 488            | 174          |                  |       |                                         |
| 29       | 6.550            |          |        | 600<br>2514    | 141<br>663   |                  |       |                                         |
| 30       | 7.033            |          |        | 4009           | 1116         |                  |       |                                         |
| 31       | 7.248            |          |        | 531            | 121          |                  |       |                                         |
| 32       | 7.395            |          |        | 307            | 113          |                  |       |                                         |
| 33       | 7.763            |          |        | 3350           | 570          |                  |       |                                         |
| 34       | 7.951            |          |        | 2025           | 521          |                  |       |                                         |
| 35       | 8.082            |          |        | 1018           | 267          |                  |       |                                         |
| 36       | 8.357            |          |        | 550            | 88           |                  |       |                                         |
| 37       | 8.477            |          |        | 472            | 154          |                  |       |                                         |
| 38       | 8.541            |          |        | 748            | 239          |                  |       |                                         |
| 39       | 8.603            |          |        | 1498           | 363          |                  |       |                                         |
| 40       | 8.873            |          |        | 560            | 105          |                  |       |                                         |
| 41       | 9.252            |          |        | 4223           | 760          |                  |       |                                         |
| 42       | 9.640            |          |        | 2469           | 459          |                  |       |                                         |
| 43       | 10.334           |          |        | 3266           | 777          |                  |       |                                         |
| 44       | 11.604           |          |        | 988            | 225          |                  |       |                                         |
| 45       | 11.786           |          |        | 395            | 92           |                  |       |                                         |
| 46       | 12.435           | 12 757   | 0 021  | 3449           | 650          | 2 40100          | _     | D##33                                   |
| 47<br>48 | 13.783           | 13.752   | 0.031  | 2202           | 184          | 2.49129          | a     | BZ#77                                   |
| 49       | 14.626<br>16.009 |          |        | 3005<br>1529   | 635<br>159   |                  |       |                                         |
| 50       | 16.273           |          |        | 42747          | 4345         |                  |       |                                         |
| 51       | 17.312           |          |        | 3098           | 272          |                  |       |                                         |
| 52       | 18.010           |          |        | 3196           | 515          |                  |       |                                         |
| 53       | 19.143           |          |        | 585            | 113          |                  |       |                                         |
| 54       | 19.343           |          |        | 265            | 4.2          |                  |       |                                         |
| 55       | 19.786           |          |        | 1724           | 230          |                  |       |                                         |

|   | Peak | Peak                 | Expected | Delta   |             |            | Extract Conc. |       |                     |
|---|------|----------------------|----------|---------|-------------|------------|---------------|-------|---------------------|
|   | No.  |                      | RT       | RT      | Area        | Height     | (ppb)         | Flags | Peak Identification |
|   |      |                      |          | ======= |             |            |               | ====  |                     |
|   |      | 6 20.444             |          |         | 2817        | 340        |               |       |                     |
|   |      | 7 20.770             |          |         | 2778        | 352        |               |       |                     |
|   |      | 8 21.462             |          |         | 942         | 146        |               |       |                     |
|   |      | 9 21.947             |          |         | 3597        | 279        |               |       |                     |
|   |      | 0 22.282             |          |         | 637         | 98         |               |       |                     |
| • |      | 1 22.546             | 22.559   | -0.013  | 333236      | 65688      | 44.0461       |       | BZ#198              |
|   |      | 2 23.375             |          |         | 5150        | 667        |               |       |                     |
|   |      | 3 24.645             |          |         | 890         | 154        |               |       |                     |
|   |      | 4 25.252             |          |         | 1156        | 137        |               |       |                     |
|   |      | 5 25.682             |          |         | 2128        | 206        |               |       |                     |
|   |      | 6 25.975             |          |         | 1445        | 206        |               |       |                     |
|   |      | 7 27.653             |          |         | 2864        | 317        |               |       |                     |
|   |      | 8 27.901<br>9 28.063 |          |         | 868         | 143        |               |       |                     |
|   |      |                      |          |         | 1006        | 164        |               |       |                     |
|   |      | 0 28.333<br>1 28.511 |          |         | 2990        | 538        |               |       |                     |
|   |      | 28.828               |          |         | 1519<br>998 | 238<br>134 |               |       |                     |
|   |      | 2 28.828<br>3 29.111 |          |         | 3313        | 252        |               |       |                     |
|   |      | 4 29.553             |          |         | 6312        | 361        |               |       |                     |
|   |      | 5 29.845             |          |         | 8439        | 685        |               |       |                     |
|   |      | 6 30.526             |          |         | 14380       | 2056       |               |       |                     |
|   |      | 7 31.317             |          |         | 5292        | 189        |               |       |                     |
|   |      | 8 31.483             |          |         | 804         | 176        |               |       |                     |
|   |      | 9 31.621             |          |         | 377         | 98         |               |       |                     |
|   |      | 0 31.745             |          |         | 604         | 155        | •             | 90 5  |                     |
|   |      | 1 31.982             |          |         | 553         | 142        |               |       |                     |
|   |      | 2 32.228             |          |         | 8941        | 1486       |               |       |                     |
|   |      | 3 32.339             |          |         | 8538        | 892        |               |       |                     |
|   |      | 4 32.585             |          |         | 1044        | 313        |               |       |                     |
|   |      | 5 32.789             |          |         | 6619        | 1031       |               |       |                     |
|   |      | 6 32.898             |          |         | 3180        | 603        |               |       |                     |
|   | 8    | 7 33.019             |          |         | 3850        | 662        |               |       |                     |
|   | 8    | 8 33.148             |          |         | 5029        | 737        |               |       |                     |
|   | 8    | 9 33.292             |          |         | 9940        | 840        |               |       |                     |
|   | 9    | 0 33.507             |          |         | 17075       | 2289       |               |       |                     |
|   | 9    | 1 33.822             |          |         | 4041        | 406        |               |       |                     |
|   | 9    | 2 34.114             |          |         | 1237        | 309        |               |       |                     |
|   | 9    | 3 34.263             |          |         | 3019        | 358        |               |       |                     |
|   | 9    | 4 34.702             |          |         | 10793       | 1393       |               |       |                     |
|   | 9    | 5 35.139             |          |         | 760         | 201        |               |       |                     |
|   |      | 6 35.261             |          |         | 1923        | 264        |               |       |                     |
|   |      | 7 35.498             |          |         | 2400        | 443        |               |       |                     |
|   |      | 8 35.642             |          |         | 2743        | 387        |               |       |                     |
|   |      | 9 36.602             |          |         | 1474        | 275        |               |       |                     |
|   | 10   |                      |          |         | 739         | 156        |               |       |                     |
|   | 10   |                      |          |         | 1004        | 180        |               |       |                     |
|   | 10   |                      |          |         | 808         | 148        |               |       |                     |
|   | 10   | 3 39.069             |          |         | 1173        | 219        |               |       |                     |
|   |      |                      |          |         |             |            |               |       |                     |

U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

| Target | Compounds |
|--------|-----------|
|        |           |

| Peak<br>RT | Expected<br>RT     | Target Compound         |
|------------|--------------------|-------------------------|
| 20253253   |                    | *********************** |
| 4.999      | 5 <sub>4</sub> 001 | Tetrachloro-meta-xylene |
|            | 5.761              | BZ#8                    |
|            | 6.701              | BZ#18                   |
|            | 7.925              | BZ#28                   |
|            | 8.984              | BZ#52                   |
|            | 9.667              | BZ#44                   |
|            | 11.243             | ъд#66 0124              |

a - Peak quantitates below reporting limit

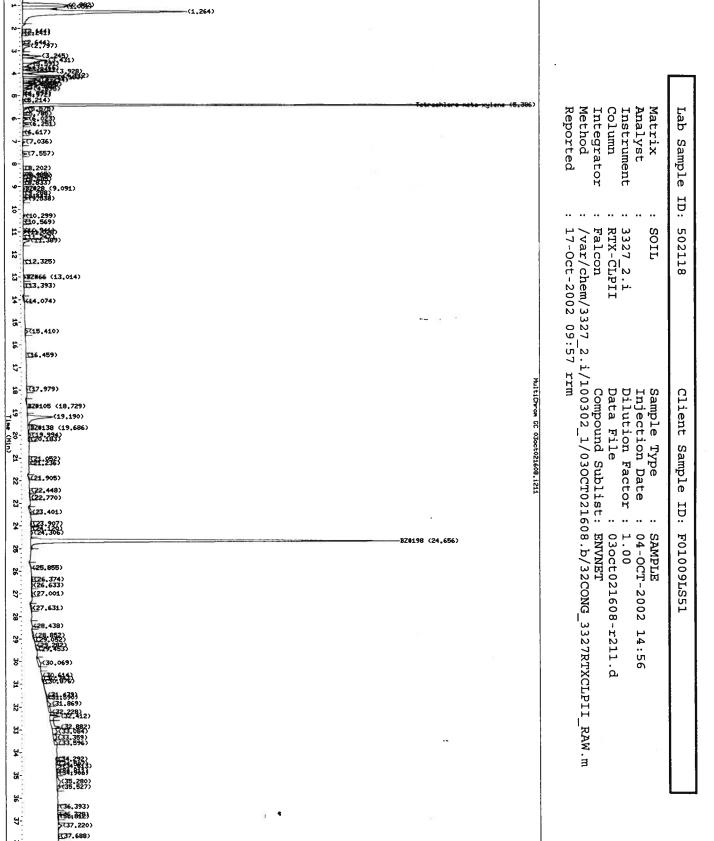
H - User selected alternate compound hit

M - Peak manually integrated or manually identified

R - Peak fails recovery

STL Burlington - Target GC Injection Report

| Peak   | Expected |                 |
|--------|----------|-----------------|
| RT     | RT       | Target Compound |
|        | =======  |                 |
|        | 12.207   | BZ#101          |
| 13.783 | 13.752   | BZ#77           |
|        | 14.938   | BZ#118          |
|        | 15.993   | BZ#153          |
|        | 16.155   | BZ#105          |
|        | 17.328   | BZ#138          |
|        | 17.762   | BZ#126          |
|        | 18.647   | BZ#128          |
|        | 20.781   | BZ#180          |
|        | 22.271   | BZ#170          |
| 22.546 | 22.559   | BZ#198          |
|        | 24.552   | BZ#195          |
|        | 27.655   | BZ#206          |
|        | 29 190   | P7#209          |



0126

8

39-

ð.

(38,107) (38,364)

(39, 235)

(40.095)

1.1-

1.2-

1.3-

14.4

Lab Sample ID: 502118 Client Sample ID: F01009LS51

Matrix : SOIL
Analyst : 
Instrument : 3327\_2.i Sample Type : SAMPLE
Injection Date : 04-OCT-2002 14:56

Dilution Factor : 1.00

Data File : 03oct021608-r211.d Column : RTX-CLPII Integrator : Falcon

Compound Sublist: ENVNET

Method : /var/chem/3327\_2.i/100302\_1/030CT021608.b/32CONG\_3327RTXCLPII\_RAW.m Reported : 17-Oct-2002\_09:57\_rrm

|          | <del></del>      |          |        |                | Pe             | aks              |       |                                         |                                         |
|----------|------------------|----------|--------|----------------|----------------|------------------|-------|-----------------------------------------|-----------------------------------------|
| Peak     | Peak             | Expected | Delta  |                |                | Extract<br>Conc. |       |                                         |                                         |
| No.      | RT               | RT       | RT     | Area           | Height         | (ppb)            | Flags | Peak Identifi                           | cation                                  |
| =====    |                  |          | ====== |                |                | ========         |       | ======================================= | ======================================= |
| 1<br>2   | 0.982<br>1.051   |          |        | 79152<br>74401 | 11845<br>11255 |                  |       |                                         |                                         |
| 3        | 1.264            |          |        | 372482         | 43833          |                  |       |                                         |                                         |
| 4        | 2.144            |          |        | 1825           | 358            |                  |       |                                         |                                         |
| 5        | 2.241            |          |        | 1436           | 362            |                  |       |                                         |                                         |
| 6        | 2.644            |          |        | 319            | 91             |                  |       |                                         |                                         |
| 7        | 2.797            |          |        | 13976          | 2039           |                  |       |                                         |                                         |
| 8        | 3.245            |          |        | 20924          | 4893           | 71.              |       |                                         |                                         |
| 9<br>10  | 3.431            |          |        | 54132          | 6423           |                  |       |                                         |                                         |
| 11       | 3.591<br>3.766   |          |        | 14651<br>8610  | 2355<br>2286   |                  |       |                                         |                                         |
| 12       | 3.841            |          |        | 3799           | 1214           |                  |       |                                         |                                         |
| 13       | 3.928            |          |        | 31318          | 8524           |                  |       |                                         |                                         |
| 14       | 4.112            |          |        | 39693          | 10279          |                  |       |                                         |                                         |
| 15       | 4.183            |          |        | 26901          | 8778           |                  |       |                                         |                                         |
| 16       | 4.294            |          |        | 17281          | 4598           |                  |       |                                         |                                         |
| 17       | 4.371            |          |        | 7433           | 2523           |                  |       |                                         |                                         |
| 18       | 4.451            |          |        | 2430           | 1251           |                  |       |                                         |                                         |
| 19       | 4.495            |          |        | 9783           | 2901           |                  |       |                                         |                                         |
| 20       | 4.582            |          |        | 6109           | 1564           |                  |       |                                         |                                         |
| 21<br>22 | 4.695            |          |        | 7544           | 2401           |                  |       |                                         |                                         |
| 23       | 4.897<br>4.972   |          |        | 363<br>1266    | 99             |                  |       |                                         |                                         |
| 24       | 5.214            |          |        | 1266           | 166<br>44      |                  |       |                                         |                                         |
| \$ 25    | 5.386            | 5.391    | -0.004 | 469529         | 160701         | 42.6398          |       | Tetrachloro-meta-xylene                 |                                         |
| 26       | 5.575            | 2.222    | 0.001  | 3760           | 896            | 42.0398          |       | rectaciiioio-meta-xyrene                |                                         |
| 27       | 5.785            |          |        | 1291           | 297            |                  |       |                                         |                                         |
| 28       | 6.023            |          |        | 4879           | 1295           |                  |       |                                         |                                         |
| 29       | 6.251            |          |        | 4450           | 1425           |                  |       |                                         |                                         |
| 30       | 6.617            |          |        | 549            | 135            |                  |       |                                         |                                         |
| 31       | 7.036            |          |        | 3104           | 664            |                  |       |                                         |                                         |
| 32       | 7.557            |          |        | 3697           | 1139           |                  |       |                                         |                                         |
| 33       | 8.202            |          |        | 839            | 154            |                  |       |                                         |                                         |
| 34<br>35 | 8.465<br>8.528   |          |        | 915            | 217            |                  |       |                                         |                                         |
| 36       | 8.685            |          |        | 2531<br>1193   | 544<br>350     |                  |       |                                         |                                         |
| 37       | 8.833            |          |        | 306            | 95             |                  |       |                                         |                                         |
| 38       | 9.091            | 9.137    | -0.047 | 2371           | 422            | 1.31493          | a     | BZ#28                                   |                                         |
| 39       | 9.288            |          |        | 671            | 136            | 2.52155          | _     | 55#20                                   |                                         |
| 40       | 9.447            |          |        | 655            | 162            |                  |       |                                         |                                         |
| 41       | 9.538            |          |        | 5909           | 1094           |                  |       |                                         |                                         |
| 42       | 10.299           |          |        | 2029           | 435            |                  |       |                                         |                                         |
| 43       | 10.569           |          |        | 640            | 170            |                  |       |                                         |                                         |
| 44       | 10.941           |          |        | 257            | 78             |                  |       |                                         |                                         |
| 45       | 11.028           |          |        | 3262           | 829            |                  |       |                                         |                                         |
| 46       | 11.247           |          |        | 674            | 128            |                  |       |                                         |                                         |
| 47<br>48 | 11.389<br>12.325 |          |        | 9967<br>752    | 1687           |                  |       |                                         |                                         |
| 49       | 13.014           | 13.056   | -0.042 | 1 3512         | 197<br>658     | 3 07730          |       | D7#66                                   |                                         |
| 50       | 13.393           | 13.030   | -0.042 | 1179           | 658<br>177     | 2.07730          | d     | BZ#66                                   |                                         |
| 51       | 14.074           |          |        | 3801           | 199            |                  |       |                                         |                                         |
| 52       | 15.410           |          |        | 5346           | 795            |                  |       |                                         |                                         |
| 53       | 16.459           |          |        | 668            | . 115          |                  |       |                                         |                                         |
| 54       | 17.979           |          |        | 1503           | 206            |                  |       |                                         |                                         |
| 55       | 18.729           | 18.720   | 0.009  | 2187           | 500            | 1 287036         | a     | BZ#105                                  |                                         |

|       |        |          |         |        |        | Extract  |       |        |                  |    |
|-------|--------|----------|---------|--------|--------|----------|-------|--------|------------------|----|
| Peak  | Peak   | Expected | Delta   |        |        | Conc.    |       |        |                  |    |
| No.   | RT     | RT       | RT      | Area   | Height | (ppb)    | Flags | F      | eak Identificati | on |
| ====  |        |          | ======= |        |        |          | ====  |        |                  |    |
| 56    | 19.190 |          |         | 52936  | 6633   |          |       |        |                  |    |
| 57    | 19.686 | 19.713   | -0.027  | 7035   | 511    | 0.493629 | a     | BZ#138 |                  |    |
| 58    | 19.994 |          |         | 3983   | 690    |          |       |        |                  |    |
| 59    | 20.183 |          |         | 2767   | 336    |          |       |        |                  |    |
| 60    | 21.052 |          |         | 1617   | 208    |          |       |        |                  |    |
| 61    | 21.236 |          |         | 336    | 84     |          |       |        |                  |    |
| 62    | 21.905 |          |         | 1630   | 231    |          |       |        |                  |    |
| 63    | 22.448 |          |         | 1136   | 226    |          |       |        |                  |    |
| 64    | 22.770 |          |         | 1222   | 157    |          |       |        |                  |    |
| 65    | 23.401 |          |         | 5739   | 331    |          |       |        |                  |    |
| 66    | 23.907 |          |         | 1937   | 280    |          |       |        |                  |    |
| 67    | 24.120 |          |         | 1179   | 210    |          |       |        |                  |    |
| 68    | 24.306 |          |         | 3932   | 513    |          |       |        |                  |    |
| \$ 69 | 24.656 | 24.678   | -0.022  | 531541 | 98310  | 41.2810  |       | BZ#198 |                  |    |
| 70    | 25.855 |          |         | 2082   | 93     |          |       |        |                  |    |
| 71    | 26.374 |          |         | 2723   | 474    |          |       |        |                  |    |
| 72    | 26.633 |          |         | 4159   | 392    |          |       |        |                  |    |
| 73    | 27.001 |          |         | 4941   | 364    |          |       |        |                  |    |
| 74    | 27.631 |          |         | 4134   | 334    |          |       |        |                  |    |
| 75    | 28.438 |          |         | 892    | 14     |          |       |        |                  |    |
| 76    | 28.852 |          |         | 5272   | 358    |          |       |        |                  |    |
| 77    | 29.052 |          |         | 1196   | 200    |          |       |        |                  |    |
| 78    | 29.282 |          |         | 661    | 105    |          |       |        |                  |    |
| 79    | 29.453 |          |         | 1544   | 254    |          | - 2   |        |                  |    |
| 80    | 30.069 |          |         | 12352  | 896    | • •      | 50    |        |                  |    |
| 81    | 30.614 |          |         | 790    | 103    |          |       |        |                  |    |
| 82    | 30.747 |          |         | 668    | 166    |          |       |        |                  |    |
| 83    | 30.876 |          |         | 1978   | 392    |          |       |        |                  |    |
| 84    | 31.479 |          |         | 3898   | 246    |          |       |        |                  |    |
| 85    | 31.590 |          |         | 869    | 180    |          |       |        |                  |    |
| 86    | 31.869 |          |         | 8660   | 961    |          |       |        |                  |    |
| 87    | 32.228 |          |         | 8399   | 492    |          |       |        |                  |    |
| 88    | 32.412 |          |         | 16872  | 2688   |          |       |        |                  |    |
| 89    | 32.882 |          |         | 22467  | 2232   |          |       |        |                  |    |
| 90    | 33.084 |          |         | 16177  | 1297   |          |       |        |                  |    |
| 91    | 33.359 |          |         | 10643  | 885    |          |       |        |                  |    |
| 92    | 33.596 |          |         | 8436   | 838    |          |       |        |                  |    |
| 93    | 34.292 |          |         | 2161   | 340    |          |       |        |                  |    |
| 94    | 34.507 |          |         | 2654   | 396    |          |       |        |                  |    |
| 95    | 34.613 |          |         | 9455   | 1382   |          |       |        |                  |    |
| 96    | 34.811 |          |         | 2127   | 392    |          |       |        |                  |    |
| 97    | 34.906 |          |         | 2477   | 368    |          |       |        |                  |    |
| 98    | 35.280 |          |         | 15976  | 976    |          |       |        |                  |    |
| 99    | 35.527 |          |         | 6533   | 987    |          |       |        |                  |    |
| 100   | 36.393 |          |         | 1738   | 250    |          |       |        |                  |    |
| 101   | 36.728 |          |         | 379    | 113    |          |       |        |                  |    |
| 102   | 36.812 |          |         | 2468   | 240    |          |       |        |                  |    |
| 103   | 37.220 |          |         | 8746   | 1036   |          |       |        |                  |    |
| 104   | 37.688 |          |         | 1987   | 379    |          |       |        |                  |    |
| 105   | 38.107 |          |         | 952    | 185    |          |       |        |                  |    |
| 105   | 38.364 |          |         | 410    | 89     |          |       |        |                  |    |
| 107   | 38.987 |          |         | 366    | 86     |          |       |        |                  |    |
| 108   | 39.235 |          |         | 7064   | 556    |          |       |        |                  |    |
| 109   | 40.095 |          |         | 3375   | 269    |          |       |        |                  |    |
| 103   | ±0.033 |          |         | 33/5   | 209    |          |       |        |                  |    |

Flags: A - Peak quantitates above calibration range

0128

a - Peak quantitates below reporting limit H - User selected alternate compound hit

M - Peak manually integrated or manually identified

R - Peak fails recovery

U - User disabled peak ID: either peak quantitates below reporting limit or  ${\tt peak \ identification \ not \ confirmed \ on \ second \ column}$ 

| Peak        | Expected |                  |
|-------------|----------|------------------|
| RT          | RT       | Target Compound  |
| 2222222     | ======   |                  |
| <del></del> |          | Carget Compounds |

| Peak<br>RT | Expected<br>RT | Target Compound                         |
|------------|----------------|-----------------------------------------|
|            |                | ======================================= |
| 5.386      | 5.391          | Tetrachloro-meta-xylene                 |
|            | 6.592          | BZ#8                                    |
|            | 7.698          | BZ#18                                   |
| 9.091      | 9.137          | BZ#28                                   |
|            | 10.341         | BZ#52                                   |
|            | 11.312         | BZ#44                                   |
| 13.014     | 13.056         | BZ#66                                   |
|            | 13.914         | BZ#101                                  |
|            | 16.080         | BZ#77                                   |
|            | 17.075         | BZ#118                                  |
|            | 17.995         | BZ#153                                  |
| 18.729     | 18.720         | BZ#105                                  |
| 19.686     | 19.713         | BZ#138                                  |
|            | 20.225         | BZ#126                                  |
|            | 21.462         | BZ#128                                  |
|            | 23.115         | BZ#180                                  |
| 24.656     | 24.678         | BZ#198                                  |
|            | 25.004         | BZ#170                                  |
|            | 27.203         | BZ#195                                  |
|            | 29.805         | BZ#206 -~ **                            |
|            | 30.754         | BZ#209                                  |

# FORM 1 OTHER ORGANICS ANALYSIS DATA SHEET

ENVNET SAMPLE NO.

F01009LS52

Lab Name: STL BURLINGTON Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

Matrix: (soil/water) SOIL Lab Sample ID: 502117

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 030CT021608-R201

% Moisture: 24 decanted: (Y/N) N Date Received: 09/25/02

Extraction: (SepF/Cont/Sonc) SOXH Date Extracted: 09/26/02

Concentrated Extract Volume: 10 (mL) Date Analyzed: 10/04/02

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: \_\_\_ Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG Q

| 34883-43-7BZ#8   | 2.2 U |
|------------------|-------|
| 37680-65-2BZ#18  | 2.2 U |
| 7012-37-5BZ#28   | 2.2 U |
| 41464-39-5BZ#44  | 2.2 U |
| 35693-99-3BZ#52  |       |
| 32598-10-0BZ#66  |       |
| 32598-13-3BZ#77  | 2.2 U |
| 37680-73-2BZ#101 |       |
| 32598-14-4BZ#105 | 2.2 U |
| 31508-00-6BZ#118 | 2.2 U |
| 57465-28-8BZ#126 | 2.2 U |
| 38380-07-3BZ#128 | 2.2 U |
| 35065-28-2BZ#138 | 2.2 U |
| 35065-27-1BZ#153 | 2.2 U |
| 35065-30-6BZ#170 | 2.2 U |
| 35065-29-3BZ#180 | 2.2 U |
| 52663-68-0BZ#187 | 2.2 U |
| 52663-78-2BZ#195 | 2.2 U |
| 40186-72-9BZ#195 | 2.2 U |
| 2051-24-3BZ#209  | 2.2 U |
| ZUDI-74-2        |       |

FORM I OTHER

|      | إندر            | 19.889?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1,208) |        |          |                          |                                |                                                                                                                                                   |                                 |
|------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------|----------|--------------------------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| -    | N-(             | ET:878}                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |        |          |                          | 20,20                          |                                                                                                                                                   |                                 |
|      | Ŧ:              | (2,316)<br>(3,922)<br>(4,937)<br>(4,939)<br>(4,939)<br>(4,693)<br>(4,690)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |        |          |                          |                                |                                                                                                                                                   |                                 |
|      | 5 6 7 8 9 10 11 | (学)<br>(表: 893)<br>(表: 894)<br>(表: 894)<br>(表: 894)<br>(表: 894)<br>(表: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(本: 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894)<br>(*** 894) |        | 7 22   |          | -Tetrashlara neta nyiene | <del>(4,99</del> 6)            | Matrix : SC<br>Analyst :<br>Instrument : 33<br>Column : RI<br>Integrator : Fa<br>Method : /v<br>Reported : 17                                     | mple ID: 5                      |
|      | 12 13 14        | E11:988}<br>5(12,433)<br>102877 (13,794)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |        |          |                          |                                | SOIL 3327_1.i RTX-5 Falcon /var/chem/3 17-Oct-2002                                                                                                | 02117                           |
|      | 15 16           | (16,007)<br>(16,293)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |        |          | ** ** #                  |                                | 3327                                                                                                                                              |                                 |
| 1    | 47              | (17,314)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |        |          |                          | 7                              | ۲<br>۲ <u>۰</u>                                                                                                                                   |                                 |
|      | 18 19           | (19,010)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |        |          |                          | HultiChrom GC 03oot021608,1201 | Sample Type : SAMPLE Injection Date : 04-OCT-2 Dilution Factor : 1.00 Data File : 03oct021 Compound Sublist: ENVNET 100302_1/03OCT021608.b/32COrm | Client                          |
| 7    | 19 20 3         | 119,784>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |        |          |                          | 8                              | )le                                                                                                                                               | l ä l                           |
| nan/ |                 | (20.440)<br>(20.770)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |        |          |                          | 3001                           | le Tynetion leion leion leion leion leion le File bund [2] [1/0]                                                                                  | 1 1                             |
| 1    | 57-             | (21,460)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |        |          |                          | 021608                         | Type fon Dan Fac. 1e 10 Sul./0300                                                                                                                 | Sample                          |
| İ    | 23-             | (21,945)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        | BZ#198 | (22,546) |                          | 9.1201                         | pe<br>Date<br>Factor<br>Sublist<br>30CT021                                                                                                        | )le                             |
|      | 23-             | 123,379)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |        |          |                          |                                | or<br>or<br>021                                                                                                                                   | $\mid \mid \mid \mid \mid \mid$ |
|      | 2               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |        |          | •                        |                                | 6                                                                                                                                                 | <sup>D</sup>                    |
|      | Ŋ-              | (24,652)<br>(25,241)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |        |          |                          |                                | SAMP:<br>04-00<br>1.00<br>03oct<br>ENVNI<br>8.b/:                                                                                                 | FO                              |
|      | 26-             | (25,669)<br>(25,942)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |        |          |                          |                                | SAMPLE<br>04-OCT-<br>1.00<br>03oct02<br>ENVNET<br>8.b/32C                                                                                         | 100                             |
|      | 27              | (26,904)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |        |          |                          |                                | SAMPLE 04-OCT-2 1.00 03oct021 ENVNET 8.b/32CO                                                                                                     | F01009LS                        |
|      | &-<br>-         | \$27:644}                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |        |          |                          |                                | 002<br>608                                                                                                                                        | 52                              |
|      | 29-             | (29,154)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |        |          |                          |                                | 3 ; <u>1</u>                                                                                                                                      | 1 1                             |
|      | ٠<br>۵-         | (29.836)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |        |          |                          |                                | 14:11<br>r201.d                                                                                                                                   | 1 1                             |
|      | - 10<br>- 15    | \$30.523)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |        |          |                          |                                | .4:11<br>201.d<br>27RTX5                                                                                                                          |                                 |
|      | <u>3</u> -      | 131,962)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |        |          |                          |                                | 2                                                                                                                                                 |                                 |
|      | 32:<br>32:      | (32,505)<br>(32,505)<br>(32,789)<br>(33,037)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |        |        |          |                          |                                | _RAW.m                                                                                                                                            |                                 |
|      | <u>ب</u>        | (33,496)<br>(33,822)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |        |          | 24-                      | 2                              | _                                                                                                                                                 |                                 |
|      | ધ-              | 5(34.693)<br>(35.267)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |        |          |                          |                                |                                                                                                                                                   |                                 |
|      | 36              | 35,679)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |        |          |                          |                                | ,                                                                                                                                                 |                                 |
| 1    |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        | . 4    |          |                          |                                |                                                                                                                                                   |                                 |

0131

(xdor6)

(37.870)

(39.650)

Client Sample ID: F01009LS52 Lab Sample ID: 502117

Sample Type : SAMPLE

Matrix : SOIL Analyst : Analyst : www. Instrument : 3327\_1.i we Injection Date : 04-OCT-2002 14:11

Dilution Factor: 1.00

Column :  $RTX-\overline{5}$ Data File : 03oct021608-r201.d

Compound Sublist: ENVNET Integrator : Falcon

Method : /var/chem/3327\_1.i/100302\_1/03OCT021608.b/32CONG\_3327RTX5\_RAW.m Reported : 17-Oct-2002 09:45 rrm

Peaks

|          |                |          | <b>5</b> 1/ |             |                  | Extract |        |                         |     |
|----------|----------------|----------|-------------|-------------|------------------|---------|--------|-------------------------|-----|
| Peak     | Peak           | Expected | Delta       | 2200        | Voight           | Conc.   | E1 200 | Dosk Idontificat        | ion |
| No.      | RT             | RT       | RT          | Area        | Height           | (ppb)   | Flags  | Peak Identificat        |     |
| 1        | 0.889          |          |             | 50663       | 8659             |         |        |                         |     |
| 2        | 1.000          |          |             | 47398       | 7700             |         |        |                         |     |
| 3        | 1.208          |          |             | 120573      | 13955            |         |        |                         |     |
| 4        | 1.674          |          |             | 1374        | 252              |         |        |                         |     |
| 5        | 1.878          |          |             | 1155        | 241              |         |        |                         |     |
| 6        | 2.316          |          |             | 1515        | 211              |         |        |                         |     |
| 7        | 2.922          |          |             | 28534       | 7050             |         |        |                         |     |
| ° 8      | 3.086          |          |             | 15750       | 3637             |         |        |                         |     |
| 9        | 3.267          |          |             | 23409       | 4072             | . 2     | 701    |                         |     |
| 10       | 3.407          |          |             | 10874       | 2175             |         |        |                         |     |
| 11       | 3.584          |          |             | 9196        | 1808             |         |        |                         |     |
| 12       | 3.768          |          |             | 9515        | 3028             |         |        |                         |     |
| 13       | 3.981          |          |             | 3466        | 864              |         |        |                         |     |
| 14       | 4.303          |          |             | 1009        | 155              |         |        |                         |     |
| 15       | 4.393          |          |             | 5690        | 2034             |         |        |                         |     |
| 16       | 4.690          |          |             | 1566        | 606              |         |        |                         |     |
| \$ 17    | 4.996          | 5.001    | -0.005      | 345031      | 137446           | 43.6096 |        | Tetrachloro-meta-xylene |     |
| 18       | 5.402          |          |             | 1120        | 185              |         |        |                         |     |
| 19       | 5.577          |          |             | 4541        | 1447             |         |        |                         |     |
| 20       | 5.865          |          |             | 752         | 194              |         |        |                         |     |
| 21       | 6.038          |          |             | 462         | 168              |         |        |                         |     |
| 22       | 6.331          |          |             | 242         | 64               |         |        |                         |     |
| 23       | 6.548          |          |             | 1256        | 402              |         |        |                         |     |
| 24       | 7.031          |          |             | 2845        | 787              |         |        |                         |     |
| 25       | 7.246          |          |             | 299         | 94<br>219        | •       |        |                         |     |
| 26<br>27 | 7.395          |          |             | 615<br>2255 | 556              |         |        |                         |     |
| 28       | 7.763<br>7.949 |          |             | 1717        | 462              |         |        |                         |     |
| 29       | 8.078          |          |             | 588         | 150              |         |        |                         |     |
| 30       | 8.479          |          |             | 1135        | 183              |         |        |                         |     |
| 31       | 8.603          |          |             | 972         | 264              |         |        |                         |     |
| 32       | 8.871          |          |             | 417         | 92               |         |        |                         |     |
| 33       | 9.250          |          |             | 2979        | 585              |         |        |                         |     |
| 34       | 9.638          |          |             | 1033        | 232              |         |        |                         |     |
| 35       | 10.332         |          |             | 2890        | 627              |         |        |                         |     |
| 36       | 11.600         |          |             | 1108        | 258              |         |        |                         |     |
| 37       | 11.788         |          |             | 387         | 90               |         |        |                         |     |
| 38       | 12.433         |          |             | 3319        | 626              |         |        |                         |     |
| 39       | 13.794         | 13.752   | 0.042       | 2498        | 186              | 2.49453 | a      | BZ#77                   |     |
| 40       | 14.623         |          |             | 2705        | 543              |         |        |                         |     |
| 41       | 16.007         |          |             | 1540        | 165              |         |        |                         |     |
| 42       | 16.293         |          |             | 27345       | 2493             |         |        |                         |     |
| 43       | 17.314         |          |             | 2537        | 243              |         |        |                         |     |
| 44       | 18.010         |          |             | 2345        | 452              |         |        |                         |     |
| 45       | 19.150         |          |             | 680         | 127              |         |        |                         |     |
| 46       | 19.784         |          |             | 834         | 165              |         |        |                         |     |
| 47       | 20.440         |          |             | 784         | 162              |         |        |                         |     |
| 48       | 20.770         |          |             | 1302        | 252              |         |        |                         |     |
| 49       | 21.460         |          |             | 571         | 118              |         |        |                         |     |
| 50       | 21.945         |          |             | 1232        | 226              |         |        |                         |     |
| \$ 51    | 22.546         | 22.559   | -0.013      | 336649      | 65598            | 43.9835 |        | BZ#198                  |     |
| 52       | 23.379         |          |             | 791         | 148              |         |        |                         |     |
| 53       | 24.652         |          |             | 1096        | ≥ 173            |         |        |                         |     |
| 54       | 25.241         |          |             | 617         | 102              |         |        |                         |     |
| 55       | 25.669         |          |             | 837         | ~ ~ 119 <b>/</b> | 1132    |        |                         |     |

STL Burlington - Target GC Injection Report

|      |         |          |         |       |         | Extract |       |                     |
|------|---------|----------|---------|-------|---------|---------|-------|---------------------|
| Peak | Peak    | Expected | Delta   |       |         | Conc.   |       |                     |
| No.  | RT      | RT       | RT      | Area  | Height  | (ppb)   | Flags | Peak Identification |
|      | ======= | =======  | ======= |       | ~====== |         | ===== |                     |
| 56   | 25.942  |          |         | 774   | 118     |         |       |                     |
| 57   | 26.904  |          |         | 1790  | 230     |         |       |                     |
| 58   | 27.644  |          |         | 1242  | 161     |         |       |                     |
| 59   | 27.883  |          |         | 510   | 91      |         |       |                     |
| 60   | 28.327  |          |         | 4333  | 817     |         |       |                     |
| 61   | 28.509  |          |         | 2205  | 258     |         |       |                     |
| 62   | 29.154  |          |         | 1263  | 161     |         |       |                     |
| 63   | 29.836  |          |         | 6624  | 814     |         |       |                     |
| 64   | 30.379  |          |         | 481   | 64      |         |       |                     |
| 65   | 30.523  |          |         | 11822 | 1483    |         |       |                     |
| 66   | 31.069  |          |         | 1739  | 0       |         |       |                     |
| 67   | 31.142  |          |         | 299   | 80      |         |       |                     |
| 68   | 31.636  |          |         | 318   | 38      |         |       |                     |
| 69   | 31.749  |          |         | 1843  | 313     |         |       |                     |
| 70   | 32.077  |          |         | 990   | 149     |         |       |                     |
| 71   | 32.224  |          |         | 4402  | 1052    |         |       |                     |
| 72   | 32.505  |          |         | 2412  | 236     |         |       |                     |
| 73   | 32.789  |          |         | 8916  | 761     |         |       |                     |
| 74   | 33.037  |          |         | 3158  | 519     |         |       |                     |
| 75   | 33.496  |          |         | 12291 | 1924    |         |       |                     |
| 76   | 33.633  |          |         | 4767  | 783     |         |       |                     |
| 77   | 33.822  |          |         | 3626  | 391     |         |       |                     |
| 78   | 34.693  |          |         | 7846  | 1015    |         |       |                     |
| 79   | 35.267  |          |         | 3774  | 398     | *       | 19    |                     |
| 80   | 35.679  |          |         | 10390 | 954     |         | 00.00 |                     |
| 81   | 37.870  |          |         | 12428 | 1147    |         |       |                     |
| 82   | 39.650  |          |         | 3933  | 655     |         |       |                     |
|      |         |          |         |       |         |         |       |                     |

- a Peak quantitates below reporting limit
- H User selected alternate compound hit
- M Peak manually integrated or manually identified
- R Peak fails recovery
- U User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

Target Compounds

| Peak    | Expected |                         |
|---------|----------|-------------------------|
| RT      | RT       | Target Compound         |
| ======= | =======  |                         |
| 4.996   | 5.001    | Tetrachloro-meta-xylene |
|         | 5.761    | BZ#8                    |
|         | 6.701    | BZ#18                   |
|         | 7.925    | BZ#28                   |
|         | 8.984    | BZ#52                   |
|         | 9.667    | BZ#44                   |
|         | 11.243   | BZ#66                   |
|         | 12.207   | BZ#101                  |
| 13.794  | 13.752   | BZ#77                   |
|         | 14.938   | BZ#118                  |
|         | 15.993   | BZ#153                  |
|         | 16.155   | BZ#105                  |
|         | 17.328   | BZ#138                  |
|         | 17.762   | BZ#126                  |
|         | 18.647   | BZ#128                  |
|         | 20.781   | BZ#180                  |
|         | 22.271   | BZ#170                  |
| 22.546  | 22.559   | BZ#198                  |
|         | 24.552   | BZ#195                  |
|         | 27.655   | BZ#206                  |
|         | 29.180   | BZ#209                  |
|         | : ◀      |                         |

| ľ          | SE THE PO POSSESSED AND THE THE MAIN ONE THAT                                                        |                 |                                                                                                                              |
|------------|------------------------------------------------------------------------------------------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------|
| μ.         | (0,980)                                                                                              |                 |                                                                                                                              |
| N          | Y-<br>172,146)<br>173,674)<br>182,778)                                                               |                 |                                                                                                                              |
| ч          | (3.241)                                                                                              |                 |                                                                                                                              |
| •          | 受ける。<br>(4) (566)<br>(4) (583)<br>(4) (583)<br>(5) (5) (5) (5) (5) (5) (5) (5) (5) (5)               |                 |                                                                                                                              |
| СЯ         | [41] 3983 37<br>455, 2053 255 255 255 255 255 255 255 255 255 2                                      | <br>            | #55) A A H O H A A H                                                                                                         |
| •          | \$\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\                                                              |                 | Lab Sample Matrix Analyst Instrument Column Integrator Method Reported                                                       |
| 7          | 以7.033)<br><b>经</b> 7. <del>55</del> 6)                                                              |                 | Sar<br>Cix<br>Lyst<br>Lyst<br>Imn<br>Imn<br>Dod                                                                              |
| 8          | (8: 249)<br>88: 539)                                                                                 |                 | Sample ix yst rument mn grator od rted                                                                                       |
| ۰          | 77 (8 (9 091)<br>57 (8 )<br>57 (8 )<br>57 (8 )                                                       |                 | r t le ID                                                                                                                    |
| 10         | H8:33£}                                                                                              |                 |                                                                                                                              |
|            | 7.0.382)<br>(11.385)                                                                                 |                 | 5021:<br>SOIL<br>SOIL<br>3327<br>RTX-(<br>Falce<br>/var,<br>17-0                                                             |
| 12         | 122,320)                                                                                             |                 | 502117<br>SOIL<br>3327 2.i<br>RTX-CLPII<br>Falcon<br>/var/chem/3327<br>17-Oct-2002 09                                        |
|            | EZ866 (13.010)<br>(13.3.380)                                                                         |                 | pi<br>i.i.i.i.i.i.i.i.i.i.i.i.i.i.i.i.i.i.i                                                                                  |
| *          |                                                                                                      |                 | n/3;                                                                                                                         |
| 6          | <u>(15,410)</u>                                                                                      | • 1 50          | 09:                                                                                                                          |
| 16         | (1.6.457)                                                                                            |                 | 57.                                                                                                                          |
| 17         |                                                                                                      |                 | MATH TO CO. L. T. T. T. T. T. T. T. T. T. T. T. T. T.                                                                        |
| 18         | (48,600)                                                                                             |                 | Client Sample Inject Diluti Data F Compou 100302                                                                             |
| 119        | (19,199)                                                                                             |                 |                                                                                                                              |
| Time (Min) |                                                                                                      |                 |                                                                                                                              |
| 25         | (221.043)                                                                                            |                 | t Sample e Type tion Dattion Fact file und Subl _1/030CT                                                                     |
| 8          | (21.903)                                                                                             |                 |                                                                                                                              |
| 2          | 1722.453)<br>1722.772)<br>1728180 (23.078)                                                           |                 | ample ID: F01009  'ype : SAMPLE 'n Date : 04-OCT 'Factor : 1.00 'e : 03oct0 'e : 03oct0 'c Sublist: ENVNET '03OCT021608.b/32 |
| 3          | : [<br>- 133,743<br>- 123,365                                                                        | •               | 1600<br>1 0 0 1                                                                                                              |
| 8          |                                                                                                      | BZ#198 (24,656) | F0100<br>SAMPL<br>04-OC<br>1.00<br>03oct<br>ENVNE<br>8.b/3                                                                   |
| 5          | 125.833)                                                                                             |                 | F01009 SAMPLE 04-OCT 1.00 03oct0 ENVNET 8.b/32                                                                               |
| 1          | . )                                                                                                  |                 | 1-20<br>216                                                                                                                  |
| 8          | (27,631)                                                                                             |                 | ,S52<br>2002<br>1608                                                                                                         |
| 0          | \(\lambda_{28,407}\) \(\lambda_{28,823}\) \(\lambda_{22,085}\)                                       |                 | 14<br>-r2<br>332                                                                                                             |
| ٤          | 123,455)<br>- 123,683)                                                                               |                 | LS52<br>-2002 14:11<br>21608-r201.d                                                                                          |
| ٤          | (38.342)                                                                                             |                 | XCI d                                                                                                                        |
| ۲          | (31, 472)<br>>(31, 865)<br>(22, 159)<br>(232, 410)                                                   |                 | LS52<br>-2002 14:11<br>21608-r201.d<br>CONG_3327RTXCLPII                                                                     |
| ٤          | - <del>\\ \tau \tau \tau \tau \tau \tau \tau \t</del>                                                |                 |                                                                                                                              |
| ١          | - (53, 56)<br>- (54, 56)<br>- (55, 16)                                                               | <br>'1          | RAW.m                                                                                                                        |
| g          | 5744 (85))<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- |                 | a l                                                                                                                          |
| 8          | 735,522)<br>- (736,096)<br>(36,373)                                                                  |                 |                                                                                                                              |
| ٥          | 7(37,220)                                                                                            |                 |                                                                                                                              |
| 1          | · -                                                                                                  |                 | 1                                                                                                                            |

0134

Y (x10^5)

0.7-

539,020)

38-

39 40

Lab Sample ID: 502117 Client Sample ID: F01009LS52

Sample Type : SAMPLE

Injection Date : 04-OCT-2002 14:11

Dilution Factor: 1.00

Column : RTX-CLPII Integrator : Falcon Data File : 03oct021608-r201.d

Compound Sublist: ENVNET

Method : /var/chem/3327\_2.i/100302\_1/03OCT021608.b/32CONG\_3327RTXCLPII\_RAW.m Reported : 17-Oct-2002 09:57 rrm

|          |                  |          |        |               | Pea                  | ks      |       |                         |
|----------|------------------|----------|--------|---------------|----------------------|---------|-------|-------------------------|
|          |                  |          |        |               |                      | Extract |       |                         |
| Peak     | Peak             | Expected | Delta  | _             |                      | Conc.   |       |                         |
| No.      | RT               | RT       | RT     | Area          | Height               | (ppb)   | Flags | Peak Identification     |
| 1        | 0.980            |          |        | 136542        | 9891                 |         | ===== |                         |
| 2        | 1.257            |          |        | 186132        | 21671                |         |       |                         |
| 3        | 2.146            |          |        | 657           | 127                  |         |       |                         |
| 4        | 2.434            |          |        | 774           | 127                  |         |       |                         |
| 5        | 2.558            |          |        | 216           | 31                   |         |       |                         |
| 6        | 2.729            |          |        | 378           | 146                  |         |       |                         |
| 7<br>8   | 2.795<br>3.241   |          |        | 1346<br>22877 | 280<br>5468          |         |       |                         |
| 9        | 3.356            |          |        | 28523         | 8135                 | ٠       |       |                         |
| 10       | 3.425            |          |        | 42148         | 7233                 |         |       |                         |
| 11       | 3.584            |          |        | 12812         | 2723                 |         |       |                         |
| 12       | 3.660            |          |        | 4441          | 1387                 |         |       |                         |
| 13       | 3.764            |          |        | 15697         | 2869                 |         |       |                         |
| 14       | 4.056            |          |        | 14245         | 4085                 |         |       |                         |
| 15       | 4.260            |          |        | 2831          | 467                  |         |       |                         |
| 16<br>17 | 4.424            |          |        | 968<br>4361   | 234<br>881           |         |       |                         |
| 18       | 4.693            |          |        | 6935          | 2303                 |         |       |                         |
| 19       | 4.890            |          |        | 1616          | 280                  |         |       |                         |
| 20       | 5.205            |          |        | 259           | 70                   |         |       |                         |
| \$ 21    | 5.382            | 5.391    | -0.009 | 474950        | 162042               | 42.9904 |       | Tetrachloro-meta-xylene |
| 22       | 5.573            |          |        | 3784          | 936                  |         |       | <u>-</u>                |
| 23       | 5.790            |          |        | 1168          | 162                  |         |       |                         |
| 24       | 5.914            |          |        | 405           | 139                  |         |       |                         |
| 25       | 6.020            |          |        | 4496          | 1156                 | -       |       |                         |
| 26<br>27 | 6.249<br>6.426   |          |        | 4480<br>430   | 1441<br>62           |         |       |                         |
| 28       | 6.612            |          |        | 550           | 126                  |         |       |                         |
| 29       | 7.033            |          |        | 1277          | 403                  |         |       |                         |
| 30       | 7.455            |          |        | 207           | 75                   |         |       |                         |
| 31       | 7.554            |          |        | 2547          | 796                  |         |       |                         |
| 32       | 8.018            |          |        | 253           | 79                   |         |       |                         |
| 33       | 8.213            |          |        | 643           | 77                   |         |       |                         |
| 34       | 8.530            |          |        | 2459          | 467                  |         |       |                         |
| 35<br>36 | 8.683            | 0 127    | 0.047  | 435           | 145                  | 1 25026 |       | 7,700                   |
| 36       | 9.091<br>9.283   | 9.137    | -0.047 | 1338<br>694   | 310<br>149           | 1.25026 | a     | BZ#28                   |
| 38       | 9.452            |          |        | 860           | 193                  |         |       |                         |
| 39       | 9.536            |          |        | 6516          | 1187                 |         |       |                         |
| 40       | 9.758            |          |        | 500           | 116                  |         |       |                         |
| 41       | 10.296           |          |        | 1251          | 242                  |         |       |                         |
| 42       | 10.496           |          |        | 1065          | 144                  |         |       |                         |
| 43       | 10.930           |          |        | 231           | 69                   |         |       |                         |
| 44       | 11.026           |          |        | 2140          | 577                  |         |       |                         |
| 45       | 11.385           |          |        | 7474          | 1307                 |         |       |                         |
| 46<br>47 | 12.320<br>13.010 | 13.056   | -0.047 | 869<br>3041   | 236<br>582           | 2.03131 |       | DOMEC                   |
| 48       | 13.010           | 13.036   | -0.047 | 1417          | 199                  | 2.03131 | a     | BZ#66                   |
| 49       | 14.202           |          |        | 5855          | 201                  |         |       |                         |
| 50       | 15.410           |          |        | 4653          | 687                  |         |       |                         |
| 51       | 16.457           |          |        | 1041          | 172                  |         |       |                         |
| 52       | 17.968           |          |        | 1838          | 234                  |         |       |                         |
| 53       | 18.600           |          |        | 1033          | 51                   |         |       |                         |
| 54       | 19.199           |          |        | 34487         | 3954                 |         |       |                         |
| 55       | 19.675           | 19.713   | -0.038 | 6582          | ^ <sup>-524</sup> 01 | 350072  | a     | BZ#138                  |

| Peak No.         RT         RT         RT         RT         Area         Height (ppb)         Flags         Peak Identification           56         19.992         4127         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663         663 <t< th=""><th></th></t<> |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| \$6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |
| \$6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |
| 57 20.183 2847 278 58 21.043 1287 149 59 21.903 961 182 60 22.453 1215 225 61 22.772 1530 222 62 23.078 23.115 -0.038 1086 227 0.543763 a BZ#180 63 23.911 1641 286 64 24.128 365 95 65 24.306 4084 637 \$ 66 24.656 24.678 -0.022 541620 100381 42.1540 BZ#198 67 24.977 25.004 -0.027 3305 382 0.927647 a BZ#170 68 25.833 1189 176 69 26.383 422 98 70 26.542 800 157 71 26.990 1336 126 72 27.631 888 50 73 28.407 2483 181 74 28.823 1327 89 75 29.085 1544 200 76 29.455 509 91 77 29.881 2276 320                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
| 58       21.043       1287       149         59       21.903       961       182         60       22.453       1215       225         61       22.772       1530       222         62       23.078       23.115       -0.038       1086       227       0.543763       a       BZ#180         63       23.911       1641       286       227       0.543763       a       BZ#180         64       24.128       365       95       95       95       95       95       95       95       95       95       95       95       95       95       95       95       95       95       95       95       95       95       95       95       95       95       95       95       95       95       95       95       95       95       95       96       92       92       94       96       92       92       92       92       92       94       96       92       96       93       93       93       93       93       93       93       93       94       94       94       94       94       94       94       94       94       94                                                                                                                                                                                       |  |
| 59       21.903       961       182         60       22.453       1215       225         61       22.772       1530       222         62       23.078       23.115       -0.038       1086       227       0.543763       a       BZ#180         63       23.911       1641       286       66       424.128       365       95       65       24.306       4084       637       65       24.306       4084       637       82       42.1540       BZ#198       66       24.656       24.678       -0.022       541620       100381       42.1540       BZ#198       82#198       66       24.977       25.004       -0.027       3305       382       0.927647       a       BZ#170       82#170       68       25.833       1189       176       69       26.383       422       98       70       26.542       800       157       71       26.990       1336       126       72       27.631       888       50       73       28.407       2483       181       74       28.823       1327       89       75       29.085       1544       200       76       29.455       509       91       79       29.881                                                                                                         |  |
| 60 22.453                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| 61 22.772                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| 62 23.078 23.115 -0.038 1086 227 0.543763 a BZ#180 63 23.911 1641 286 64 24.128 365 95 65 24.306 4084 637 \$ 66 24.656 24.678 -0.022 541620 100381 42.1540 BZ#198 67 24.977 25.004 -0.027 3305 382 0.927647 a BZ#170 68 25.833 1189 176 69 26.383 422 98 70 26.542 800 157 71 26.990 1336 126 72 27.631 888 50 73 28.407 24.83 181 74 28.823 1327 89 75 29.085 1544 200 76 29.455 509 91 77 29.881 2276 320                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| 63 23.911 1641 286 64 24.128 365 95 65 24.306 4084 637  \$ 66 24.656 24.678 -0.022 541620 100381 42.1540 BZ#198 67 24.977 25.004 -0.027 3305 382 0.927647 a BZ#170 68 25.833 1189 176 69 26.383 422 98 70 26.542 800 157 71 26.990 1336 126 72 27.631 888 50 73 28.407 24.83 181 74 28.823 1327 89 75 29.085 1544 200 76 29.455 509 91 77 29.881 2276 320                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| 64 24.128 365 95 65 24.306 4084 637 \$ 66 24.656 24.678 -0.022 541620 100381 42.1540 BZ#198 67 24.977 25.004 -0.027 3305 382 0.927647 a BZ#170 68 25.833 1189 176 69 26.383 422 98 70 26.542 800 157 71 26.990 1336 126 72 27.631 888 50 73 28.407 24.83 181 74 28.823 1327 89 75 29.085 1544 200 76 29.455 509 91 77 29.881 2276 320                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| \$ 65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| \$ 66 24.656 24.678 -0.022 541620 100381 42.1540 BZ#198 67 24.977 25.004 -0.027 3305 382 0.927647 a BZ#170 68 25.833 1189 176 69 26.383 422 98 70 26.542 8800 157 71 26.990 1336 126 72 27.631 888 50 73 28.407 24.83 181 74 28.823 1327 89 75 29.085 1544 200 76 29.455 509 91 77 29.881 2276 320                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| 67 24.977 25.004 -0.027 3305 382 0.927647 a BZ#170 68 25.833 1189 176 69 26.383 422 98 70 26.542 800 157 71 26.990 1336 126 72 27.631 888 50 73 28.407 2483 181 74 28.823 1327 89 75 29.085 1544 200 76 29.455 509 91 77 29.881 2276 320                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
| 68       25.833       1189       176         69       26.383       422       98         70       26.542       800       157         71       26.990       1336       126         72       27.631       888       50         73       28.407       2483       181         74       28.823       1327       89         75       29.085       1544       200         76       29.455       509       91         77       29.881       2276       320                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| 69     26.383     422     98       70     26.542     800     157       71     26.990     1336     126       72     27.631     888     50       73     28.407     2483     181       74     28.823     1327     89       75     29.085     1544     200       76     29.455     509     91       77     29.881     2276     320                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| 70     26.542     800     157       71     26.990     1336     126       72     27.631     888     50       73     28.407     2483     181       74     28.823     1327     89       75     29.085     1544     200       76     29.455     509     91       77     29.881     2276     320                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| 71     26.990     1336     126       72     27.631     888     50       73     28.407     2483     181       74     28.823     1327     89       75     29.085     1544     200       76     29.455     509     91       77     29.881     2276     320                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| 72     27.631     888     50       73     28.407     2483     181       74     28.823     1327     89       75     29.085     1544     200       76     29.455     509     91       77     29.881     2276     320                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| 73     28.407     2483     181       74     28.823     1327     89       75     29.085     1544     200       76     29.455     509     91       77     29.881     2276     320                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| 74     28.823     1327     89       75     29.085     1544     200       76     29.455     509     91       77     29.881     2276     320                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| 75 29.085 1544 200<br>76 29.455 509 91<br>77 29.881 2276 320                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| 76 29.455 509 91<br>77 29.881 2276 320                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |
| 77 29.881 2276 320                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| 78 30.065 6905 888                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| ····                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |
| 79 30.745 7535 347                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| 80 30.922 1887 322                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| 81 31.472 1513 134                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| 82 31.865 4919 1073                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |
| 83 32.159 343 40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| 84 32.410 11251 1896                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |
| 85 32.875 12859 1730                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |
| 86 33.017 3115 586                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| 87 33.363 6338 648                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| 88 33.580 8241 761                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| 89 34.030 7115 896                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| 90 34.199 2468 416                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| 91 34.485 2656 362                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| 92 34.607 8283 1137                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |
| 93 35.101 952 202                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| 94 35.278 3824 376                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| 95 35.522 3777 569                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| 96 36.096 3889 480                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| 97 36.373 1556 186                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| 98 37.220 8429 917                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| 99 39.020 662 114                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |

Flags: A - Peak quantitates above calibration range

a - Peak quantitates below reporting limit

H - User selected alternate compound hit

M - Peak manually integrated or manually identified

R - Peak fails recovery

U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

# Target Compounds

| Peak<br>RT | Expected<br>RT | Target Compound         |
|------------|----------------|-------------------------|
|            |                |                         |
| 5.382      | 5.391          | Tetrachloro-meta-xylene |
|            | 6.592          | BZ#8                    |
|            | 7.698          | BZ#18                   |
| 9.091      | 9.137          | BZ#28                   |
|            | -104341        | BZ#52                   |
|            | 11.312         | BZ#44                   |
| 13.010     | 13.056         | BZ#66                   |
|            | 13.914         | BZ#101                  |
|            | 16.080         | ·BZ#77                  |
|            | 17.075         | BZ#118                  |
|            | 17.995         | BZ#153() 1 36           |

STL Burlington - Target GC Injection Report

| Peak   | Expected |                 |
|--------|----------|-----------------|
| RT     | RT       | Target Compound |
| ====== | =======  |                 |
|        | 18.720   | BZ#105          |
| 19.675 | 19.713   | BZ#138          |
|        | 20.225   | BZ#126          |
|        | 21.462   | BZ#128          |
| 23.078 | 23.115   | BZ#180          |
| 24.656 | 24.678   | BZ#198          |
| 24.977 | 25.004   | BZ#170          |
|        | 27.203   | BZ#195          |
|        | 29.805   | BZ#206          |
|        | 30.754   | BZ#209          |

F01009LS53

Lab Name: STL BURLINGTON Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

Matrix: (soil/water) SOIL Lab Sample ID: 502116

Sample wt/vol: 30.1 (g/mL) G Lab File ID: 030CT021608-R191

% Moisture: 20 decanted: (Y/N) N Date Received: 09/25/02

Extraction: (SepF/Cont/Sonc) SOXH Date Extracted: 09/26/02

Concentrated Extract Volume: 10(mL) Date Analyzed: 10/04/02

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: \_\_\_ Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS:

| CAS NO.                                                             | COMPOUND                   | (ug/L or ug/l |                                 | Q           |
|---------------------------------------------------------------------|----------------------------|---------------|---------------------------------|-------------|
| 34883-43-7<br>37680-65-2<br>7012-37-5<br>41464-39-5                 | BZ#18<br>BZ#28<br>BZ#44    |               | 2.1<br>2.1<br>2.1<br>2.1        | บ<br>บ<br>บ |
| 35693-99-3-<br>32598-10-0<br>32598-13-3<br>37680-73-2<br>32598-14-4 | BZ#66<br>BZ#77<br>BZ#101   |               | 2.1<br>2.1<br>2.1<br>2.1<br>2.1 | บ<br>บ<br>บ |
| 31508-00-6<br>57465-28-8<br>38380-07-3<br>35065-28-2                | BZ#126<br>BZ#128<br>BZ#138 |               | 2.1<br>2.1<br>2.1<br>2.1        | บ<br>บ<br>บ |
| 35065-27-1<br>35065-30-6<br>35065-29-3<br>52663-68-0<br>52663-78-2  | BZ#170<br>BZ#180<br>BZ#187 |               | 2.1<br>2.1<br>2.1<br>2.1<br>2.1 | บ<br>บ<br>บ |
| 40186-72-9                                                          | BZ#206                     |               | 2.1                             | U           |

FORM I OTHER

| Γ.                     |                                                  |       |         | Y (x10^5) |                   |                |                               | ]                                                                                                                                         |
|------------------------|--------------------------------------------------|-------|---------|-----------|-------------------|----------------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 0-                     |                                                  | ¢, ¢, |         | 9         | a 194 <b>F</b> 12 | 1.3-           | 4 5                           | 0.00                                                                                                                                      |
|                        | <u>&gt;</u> -{4°,-887⟩                           |       |         |           |                   |                |                               |                                                                                                                                           |
| =                      | (1,538)                                          | EM. E |         |           | (1.201)           |                |                               |                                                                                                                                           |
| N-                     | —<br>(************************************       |       |         |           |                   |                |                               |                                                                                                                                           |
| ω-                     |                                                  |       |         |           |                   |                |                               |                                                                                                                                           |
| :                      | (2.917)<br>23-2/3/<br>23-3/3/<br>23-3/59)        |       |         |           |                   |                |                               |                                                                                                                                           |
|                        | 55(1:387)<br>-74,686)                            |       |         |           |                   |                |                               | _                                                                                                                                         |
| O1-                    | <del></del>                                      | 8.5   |         |           |                   | Tetrashlere ne | <del>ta nylene (4,99</del> 2) |                                                                                                                                           |
| 6-                     | (5,575)<br>13,034)                               |       |         |           |                   |                |                               | RATE CHAR                                                                                                                                 |
| 1                      | F(6.544)                                         |       |         |           |                   |                |                               | Lab Sample Matrix Analyst Instrument Column Integrator Method Reported                                                                    |
| 7-                     | 25,0567)<br>17,390)<br>77,258)<br>26,055,(7,945) |       |         |           |                   |                |                               | ortion Sa                                                                                                                                 |
| ω-                     | (7,945)                                          |       |         |           |                   |                |                               | ix yst rument mn grator od rted                                                                                                           |
| ·                      | √8,472)<br>C8,869)<br>>(9,248)                   |       |         |           |                   |                |                               | or int                                                                                                                                    |
| 1 1                    | >(9,248)<br>(19,634)                             |       |         |           |                   |                |                               |                                                                                                                                           |
| 16-                    | (10,327)                                         |       |         |           |                   |                |                               |                                                                                                                                           |
| <b>#</b> -             | }                                                |       |         |           |                   |                |                               | 1                                                                                                                                         |
| 12-                    | E1:585}                                          |       |         |           |                   |                |                               | 502116<br>SOIL<br>3327_1<br>RTX-5<br>Falcon<br>/var/c<br>17-Oct                                                                           |
| 2                      | ₹12,431)                                         |       |         |           |                   |                |                               | CO CO CO CO CO CO CO CO CO CO CO CO CO C                                                                                                  |
| ₩.                     | (12.866)                                         |       |         |           |                   |                |                               | n<br>che                                                                                                                                  |
| <u>k-</u>              | (13,803)                                         |       |         |           |                   |                |                               | 502116 SOIL 3327 1.i RIX-5 Falcon /var/chem/3327 17-Oct-2002 09                                                                           |
| 15                     | 14.619)                                          |       |         |           |                   |                |                               | )2<br>2<br>3                                                                                                                              |
| CR T                   | B2#114 (15.450)                                  |       |         |           |                   | •~ (6)         |                               | 0 2                                                                                                                                       |
| 16                     | (16.295)                                         |       |         |           |                   |                |                               | 09:45                                                                                                                                     |
| 15                     | <del>(17:333</del> )                             |       |         |           |                   |                |                               | │ <b>₽</b> ∙ ┃                                                                                                                            |
| 18                     | Г                                                |       |         |           |                   |                | ₹                             | H \                                                                                                                                       |
| 1                      | (18,006)<br>(18,241)                             |       |         |           |                   |                | 1¢iQ                          | m O C D D I S a                                                                                                                           |
| 19                     |                                                  |       |         |           |                   |                | HultiChrom GC                 | Client Sample Inject Diluti Data F Compou 100302                                                                                          |
| 20-                    | (19.777)                                         |       |         |           |                   |                | 8                             |                                                                                                                                           |
| 19 20 21<br>Time (Hin) | (20.440)<br>(20.772)                             |       |         |           |                   |                | 30010                         | Client Sample Ty<br>Injection<br>Dilution:<br>Data File<br>Compound:<br>00302_1/0:                                                        |
| 12-                    | 356                                              |       |         |           |                   |                | 0912(                         | am<br>Ypy<br>F<br>Si<br>030                                                                                                               |
| 8-                     | (21.947)<br>(22.277)                             |       |         |           |                   |                | 03ect021608,1191              | Client Sample Sample Type Injection Date Dilution Facto Data File Compound Subli 00302_1/030CT0 m                                         |
| ಜ-                     | F                                                |       |         | BZ#15     | 98 (22,544)       |                | 4                             | Client Sample ID: F0 Sample Type : SA Injection Date : 04 Dilution Factor : 1. Data File : 03 Compound Sublist: EN 00302_1/030CT021608. m |
| N                      | (23,373)                                         |       |         |           |                   |                |                               | ID:                                                                                                                                       |
| 2-                     | ((24,390)<br>((24,649)                           |       |         |           |                   |                |                               | 0 H C H C 10 H                                                                                                                            |
| Ŋ-                     | (25,232)                                         |       |         |           |                   |                |                               | SAN<br>04-<br>1.0<br>03c<br>ENV                                                                                                           |
| 26-                    | (25,669)                                         |       |         |           |                   |                |                               | F01009L SAMPLE 04-OCT- 1.00 03oct02 ENVNET 8.b/32C                                                                                        |
| 1 :                    | 1                                                |       |         |           |                   |                |                               | 2T 02 T 9L                                                                                                                                |
| 27                     | (27,640)                                         |       |         |           |                   |                |                               | 1009LS53 MPLE -OCT-200 00 cct02160 VNET b/32CONG                                                                                          |
| 8-                     | 128:327)                                         |       |         |           |                   |                | }                             | 2002<br>21608<br>21608                                                                                                                    |
| 3-                     | h78,511)                                         |       |         |           |                   |                |                               | 13<br>-x1<br>332                                                                                                                          |
|                        | (29.839)                                         |       |         |           |                   |                |                               | 7 9 "                                                                                                                                     |
| ყ-<br>-                | 36,340)                                          |       |         |           |                   |                |                               | 26<br>1.0                                                                                                                                 |
| 월.                     | (30.987)<br>(31.310)                             |       |         |           |                   |                |                               | , G 4                                                                                                                                     |
| <b>⋈</b> -             | 1474, 627a)                                      |       |         |           |                   |                |                               | 'אַ                                                                                                                                       |
| 23                     | 132.924)<br>(32.512)<br>(33.924)                 |       |         |           |                   |                |                               | ¥                                                                                                                                         |
| ધ-                     | 5133,144)<br>><33,498)                           |       |         |           |                   |                |                               |                                                                                                                                           |
| ¥-                     | £34;9213                                         |       |         |           |                   |                |                               | €.H                                                                                                                                       |
| 36-                    | (34.686)                                         |       |         |           |                   |                |                               |                                                                                                                                           |
| 130                    | (35,267)<br>(35,653)                             |       |         |           |                   |                |                               |                                                                                                                                           |
| 36                     | 136.172)<br>136.446)                             |       |         |           |                   |                |                               |                                                                                                                                           |
| 37                     | <u>(37.007)</u>                                  |       |         | = 1       |                   |                |                               |                                                                                                                                           |
| 38                     | (37,417)                                         |       |         | •         |                   |                |                               |                                                                                                                                           |
| :                      |                                                  |       |         |           |                   |                |                               |                                                                                                                                           |
| 39                     | <u>(3</u> 9,213)                                 |       |         | 888       | #                 |                |                               |                                                                                                                                           |
| 8-                     |                                                  |       |         | ~         | 013               | 9              |                               |                                                                                                                                           |
|                        | 7(40,323)                                        |       |         |           | ں شہ ن            | <u> </u>       |                               |                                                                                                                                           |
| Δ-                     | * * * * * * * * * * * * * * * * * * *            |       | E 2 100 |           | II.               |                |                               |                                                                                                                                           |

Lab Sample ID: 502116 Client Sample ID: F01009LS53

Matrix : SOIL Sample Type : SAMPLE

In Injection Date : 04-OCT-2002 13:26 Analyst :

Instrument Dilution Factor : 1.00

: 3327\_1.i : RTX-5 : 03oct021608-r191.d Column Data File

Compound Sublist: ENVNET Integrator : Falcon

Method : /var/chem/3327\_1.i/100302\_1/03OCT021608.b/32CONG\_3327RTX5\_RAW.m

Reported : 17-Oct-2002 09:45 rrm

|          |                  |          |        |              | Pea        | aks      |       |                                         |  |
|----------|------------------|----------|--------|--------------|------------|----------|-------|-----------------------------------------|--|
|          |                  |          |        |              |            | Extract  |       |                                         |  |
| Peak     | Peak             | Expected | Delta  |              |            | Conc.    |       |                                         |  |
| No.      | RT               | RT       | RT     | Area         | Height     | (ppb)    | Flags | Peak Identification                     |  |
|          |                  | =======  |        | ======       |            |          |       | ======================================= |  |
| 1        | 0.887            |          |        | 43609        | 7903       |          |       |                                         |  |
| 2        | 1.009            |          |        | 52832        | 7349       |          |       |                                         |  |
| 3<br>4   | 1.201            |          |        | 498493       | 75769      |          |       |                                         |  |
| 5        | 1.538            |          |        | 19787<br>245 | 2788<br>60 |          |       |                                         |  |
| 6        | 2.319            |          |        | 1187         | 352        |          |       |                                         |  |
| 7        | 2.503            |          |        | 1633         | 251        |          |       |                                         |  |
| 8        | 2.917            |          |        | 42719        | 10117      |          |       |                                         |  |
| 9        | 3.079            |          |        | 7558         | 1293       | •        | . 3   |                                         |  |
| 10       | 3.263            |          |        | 8636         | 1209       |          |       | 20                                      |  |
| 11       | 3.400            |          |        | 2399         | 491        |          |       |                                         |  |
| 12       | 3.575            |          |        | 1819         | 379        |          |       |                                         |  |
| 13       | 3.759            |          |        | 9684         | 2220       |          |       |                                         |  |
| 14       | 3.901            |          |        | 4244         | 1325       |          |       |                                         |  |
| 15       | 3.961            |          |        | 4131         | 1346       |          |       |                                         |  |
| 16       | 4.052            |          |        | 2748         | 684        |          |       |                                         |  |
| 17       | 4.189            |          |        | 216          | 97         |          |       |                                         |  |
| 18       | 4.258            |          |        | 976          | 346        |          |       |                                         |  |
| 19       | 4.387            |          |        | 4768         | 1283       |          |       |                                         |  |
| 20       | 4.686            |          |        | 1361         | 465        |          |       |                                         |  |
| 21       | 4.992            | 5.001    | -0.009 | 346557       | 137374     | 43.5868  |       | Tetrachloro-meta-xylene                 |  |
| 22       | 5.575            |          |        | 4312         | 1420       |          |       |                                         |  |
| 23       | 5.801            |          |        | 233          | 92         |          |       |                                         |  |
| 24       | 5.859            |          |        | 773          | 210        |          |       |                                         |  |
| 25       | 6.034            |          |        | 453          | 167        |          |       |                                         |  |
| 26       | 6.544            |          |        | 1986         | 607        |          |       |                                         |  |
| 27       | 6.954            |          |        | 339          | 115        |          |       |                                         |  |
| 28       | 7.027            |          |        | 4201         | 1308       |          |       |                                         |  |
| 29       | 7.390            |          |        | 1121         | 358        |          |       |                                         |  |
| 30       | 7.758            |          |        | 2916         | 506        |          |       |                                         |  |
| 31       | 7.945            | 7.925    | 0.020  | 2934         | 793        | 0.736296 | a     | BZ#28                                   |  |
| 32       | 8.075            |          |        | 1272         | 306        |          |       |                                         |  |
| 33       | 8.472            |          |        | 4137         | 537        |          |       |                                         |  |
| 34       | 8.869            |          |        | 637          | 111        |          |       |                                         |  |
| 35       | 9.248            |          |        | 6374         | 1087       |          |       |                                         |  |
| 36       | 9.634            |          |        | 1954         | 363        |          |       |                                         |  |
| 37       | 10.327           |          |        | 4302         | 1063       |          |       |                                         |  |
| 38       | 11.595           |          |        | 803          | 197        |          |       |                                         |  |
| 39       | 11.786           |          |        | 376          | 96         |          |       |                                         |  |
| 40       | 12.431           |          |        | 2583         | 463        |          |       |                                         |  |
| 41       | 12.866           |          |        | 352          | 72         |          |       | 1 004                                   |  |
| 42       | 13.803           |          |        | 2570         | 202        |          |       |                                         |  |
| 43       | 14.619           |          |        | 2886         | 643        |          |       |                                         |  |
| 44<br>45 | 15.450<br>16.007 |          |        | 2679<br>880  | 505<br>127 |          |       |                                         |  |
| 46       | 16.007           |          |        | 22766        | 2023       |          |       |                                         |  |
| 47       | 17.137           |          |        | 2788         | 532        |          |       |                                         |  |
| 48       | 17.137           |          | 25     | 3332         | 294        |          |       |                                         |  |
| 49       | 18.006           |          |        | 2832         | 495        |          |       |                                         |  |
| 50       | 18.241           |          |        | 348          | 81         |          |       |                                         |  |
| 51       | 19.777           |          |        | 923          | 178        |          |       |                                         |  |
| 52       | 20.440           |          |        | 923          | 169        |          |       |                                         |  |
| 53       | 20.772           |          |        | 1109         | 218        |          |       |                                         |  |
| 54       | 21.947           |          |        | 1864         | 2.22 =     | 140      |       |                                         |  |
|          |                  |          |        | 1001         | ~ ~ ~~~~~~ |          |       |                                         |  |

|       |         |          |        |         |        | Extract: |       |                     |
|-------|---------|----------|--------|---------|--------|----------|-------|---------------------|
| Peak  | Peak    | Expected | Delta  |         |        | Conc.    |       |                     |
| No.   | RT      | RT       | RT     | Area    | Height | (ppb)    | Flags | Peak Identification |
| ===== | ======= |          |        | ======= |        | ======== | ===== |                     |
| \$    | 22.544  | 22.559   | -0.016 | 339145  | 66005  | 44.2667  |       | BZ#198              |
| 57    | 23.373  |          |        | 2438    | 413    |          |       |                     |
| 58    | 24.390  |          |        | 1845    | 275    |          |       |                     |
| 59    | 24.649  |          |        | 1696    | 234    |          |       | •                   |
| 60    | 25.232  |          |        | 2211    | 279    |          |       |                     |
| 61    | 25.669  |          |        | 1267    | 176    |          |       |                     |
| 62    | 27.640  |          |        | 598     | 110    |          |       |                     |
| 63    | 28.327  |          |        | 2793    | 508    |          |       |                     |
| 64    | 28.511  |          |        | 1077    | 179    |          |       |                     |
| 65    | 29.839  |          |        | 8242    | 1073   |          |       |                     |
| 66    | 30.340  |          |        | 334     | 69     |          |       |                     |
| 67    | 30.519  |          |        | 20636   | 2715   |          |       |                     |
| 68    | 30.987  |          |        | 1460    | 43     |          |       |                     |
| 69    | 31.310  |          |        | 250     | 36     |          |       |                     |
| 70    | 31.627  |          |        | 522     | 113    |          |       |                     |
| 71    | 31.738  |          |        | 7426    | 790    |          |       |                     |
| 72    | 32.097  |          |        | 687     | 117    |          |       |                     |
| 73    | 32.224  |          |        | 1838    | 354    |          |       |                     |
| 74    | 32.512  |          |        | 5283    | 345    |          |       |                     |
| 75    | 32.689  |          |        | 2210    | 443    |          |       |                     |
| 76    | 32.785  |          |        | 6037    | 917    |          |       |                     |
| 77    | 33.033  |          |        | 2717    | 540    |          |       |                     |
| 78    | 33.144  |          |        | 8241    | 1392   |          |       |                     |
| 79    | 33.498  |          |        | 11828   | 1741   |          |       |                     |
| 80    | 34.024  |          |        | 995     | 163    | • • •    | (i)   |                     |
| 81    | 34.121  |          |        | 2430    | 318    |          |       |                     |
| 82    | 34.686  |          |        | 12424   | 1688   |          |       |                     |
| 83    | 35.267  |          |        | 5718    | 873    |          |       |                     |
| 84    | 35.653  |          |        | 27411   | 3361   |          |       |                     |
| 85    | 36.172  |          |        | 820     | 139    |          |       |                     |
| 86    | 36.446  |          |        | 820     | 170    |          |       |                     |
| 87    | 37.007  |          |        | 1830    | 269    |          |       |                     |
| 88    | 37.417  |          |        | 465     | 94     |          |       |                     |
| 89    | 39.213  |          |        | 2801    | 406    |          |       |                     |
| 90    | 40.323  |          |        | 2924    | 394    |          |       |                     |
|       |         |          |        |         |        |          |       |                     |

Flags: A - Peak quantitates above calibration range

- a Peak quantitates below reporting limit
- H User selected alternate compound hit
- M Peak manually integrated or manually identified
- R Peak fails recovery
- U User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

| Tarq | et | Compounds  |
|------|----|------------|
| 1414 |    | COMPOUNTES |

| Peak    | Expected |                         |
|---------|----------|-------------------------|
| RT      | RT       | Target Compound         |
| ======= | =======  |                         |
| 4.992   | 5.001    | Tetrachloro-meta-xylene |
|         | 5.761    | B2#8                    |
|         | 6.701    | BZ#18                   |
| 7.945   | 7.925    | BZ#28                   |
|         | 8.984    | BZ#52                   |
|         | 9.667    | BZ#44                   |
|         | 11.243   | BZ#66                   |
|         | 12.207   | BZ#101                  |
|         | 13.752   | BZ#77                   |
|         | 14.938   | BZ#118                  |
|         | 15.993   | BZ#153                  |
|         | 16.155   | BZ#105                  |
|         | 17.328   | BZ#138                  |
|         | i17∉762  | BZ#126                  |
|         | 18.647   | BZ#128                  |
|         | 20.781   | BZ#180                  |
|         | 22.271   | B2#170                  |
| 22.544  | 22.559   | BZ#198                  |
|         | 24.552   | BZ#195                  |
|         | 27.655   | BZ#206() 1 4 1          |

| Peak | Expected |                 |
|------|----------|-----------------|
| RT   | RT       | Target Compound |
|      | =======  |                 |
|      | 29.180   | BZ#209          |

| <del>~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~</del> | o.8- | 1.0 | 1,2         | o de la configuración | # # # # # # # # # # # # # # # # # # # |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------|------|-----|-------------|-----------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| -(2.146)                                         |      |     |             |                       | ·—(1,252)                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <del>2.63</del> 3)                               |      |     |             |                       |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| (3.236) (3.352) .                                |      |     |             |                       | 11                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| ,                                                |      |     |             |                       | <i>a</i>                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| (5.968)<br>5,785)<br>(6,016)<br>-(6,247)         |      |     |             | Tetrachlore no        | * <del>ta kylene (5,39</del> 0)       | Mat<br>Ana<br>Ins<br>Col<br>Int<br>Met<br>Rep                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| (6,608)<br>(7,031)<br>7,381<br>7,812)<br>7,812)  |      |     |             |                       |                                       | Matrix Analyst Instrument Column Integrator Method Reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 3.5%                                             |      |     |             |                       |                                       | mer<br>atc                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| C2-898?                                          |      |     |             |                       |                                       | ř H                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 3.756)<br>9.756)<br>40.294)                      |      |     |             |                       |                                       | ** ** ** ** ** **                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 341,923)<br>>(n1.383)                            |      |     |             |                       |                                       | ្ម ក្នុង ខ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| -                                                |      |     |             |                       |                                       | SOIL 3327_2 RTX-CL Falcon /var/cl 17-Oct                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| (12,316)<br>(72#66 (13,007)                      |      |     |             |                       |                                       | CI<br>CI<br>CI<br>CI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 13,384>                                          |      |     |             |                       |                                       | SOIL  3327_2.i RTX-CLPII Falcon /var/chem/3 17-Oct-2002                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 44.076)                                          |      |     |             |                       |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <u>(</u> 15.406)                                 |      |     |             | <del></del> # #       |                                       | /3327<br>)2 09                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 16.450)                                          |      |     |             |                       |                                       | 9:5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                  |      |     |             |                       |                                       | 7 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| (17.727)<br>(17.962)<br>(18.259)                 |      |     |             |                       | Hult                                  | maa<br>10<br>00<br>11<br>11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| (48,585)                                         |      |     |             |                       | HultiChrom GC 03oot021608,1191        | Sample Typ<br>Injection<br>Dilution F<br>Data File<br>Compound S<br>100302_1/03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| (19,199)<br>((19,764)<br>((19,590)<br>(20,188)   |      |     |             |                       | 8                                     | pleectut;<br>ut;<br>a I<br>pou<br>02_                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| (20°,185)                                        |      |     |             |                       | 03oct                                 | e Typertion it on File bund 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                  |      |     |             |                       | 02160                                 | Type lon Don Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility Facility |
| (21.8%)<br>( <u>7</u> 22.446)                    |      |     |             |                       | 8, 119                                | Type: ion Date: on Factor: ile: ind Sublist: 1/030CT0216                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| TC22.765)<br>BZ#180 (23.069)<br>C23.379)         |      |     |             |                       | ٦                                     | or<br>02:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| T23.913)<br>5(24.301)                            |      |     |             |                       |                                       | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 6Z0170 (24,980)                                  |      |     | <del></del> | BZ#198 (24,652)       |                                       | SAMPLE<br>04-OCT-2002 13:26<br>1.00<br>03oct021608-x191.d<br>ENVNET<br>08.b/32CONG_3327RTXC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| (25,835)                                         |      |     |             |                       |                                       | NE POCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <del>(26:33</del> 6)                             |      |     |             |                       |                                       | 可<br>1<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| (27,626)<br>(27,946)                             |      |     |             |                       |                                       | 200<br>200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| (28,402)                                         |      |     |             |                       |                                       | 1 8 2<br>3 -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 728.812)<br>729.096)<br>729.453)                 |      |     |             |                       |                                       | 13:<br>r19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| (230,985)                                        |      |     |             |                       |                                       | 26<br>)1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| (230:502)                                        |      |     |             |                       |                                       | XCI d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| (31.470)<br>≥(31.862)                            |      |     |             |                       |                                       | I d.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| (32,292,408)<br>(32,875)                         |      |     |             |                       |                                       | H                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 1.32.875)<br>1.33.353<br>5.33.355)               |      |     |             |                       |                                       | SAMPLE<br>04-OCT-2002 13:26<br>1.00<br>03oct021608-r191.d<br>ENVNET<br>8.b/32CONG_3327RTXCLPII_RAW.m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| (233,997)<br>(2534,604)                          |      |     |             |                       |                                       | . m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 333                                              |      |     |             |                       |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                  |      |     |             |                       |                                       | L 1911                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 136,797)<br>5(37,213)                            | 1    | 4   |             |                       |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Z37.909>                                         |      |     |             |                       |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

0143

4 36

39

8-

(39,007) (39,519) (39,847)

Lab Sample ID: 502116 Client Sample ID: F01009LS53

: SOIL Sample Type : SAMPLE Matrix

: **W** : 3327\_2.i Injection Date : 04-OCT-2002 13:26 Analyst

Instrument Dilution Factor: 1.00

Data File : 03oct021608-r191.d Column : RTX-CLPII

Compound Sublist: ENVNET Integrator : Falcon

: /var/chem/3327 2.i/100302 1/030CT021608.b/32CONG 3327RTXCLPII RAW.m Method

Peaks

: 17-Oct-2002 09:57 rrm Reported

| o = 1-     | De e le        | Para a straigh | Delt-       |                       |              | Extract        |       |                         |        |
|------------|----------------|----------------|-------------|-----------------------|--------------|----------------|-------|-------------------------|--------|
| eak<br>No. | Peak<br>RT     | Expected<br>RT | Delta<br>RT | Area                  | Height       | Conc.<br>(ppb) | Flags | Peak Identifi           | ration |
| ====       |                |                |             | =======               | =======      | (PP2)          | ===== |                         |        |
| 1          | 0.969          |                |             | 60649                 | 8907         |                |       |                         |        |
| 2          | 1.057          |                |             | 74184                 | 9035         |                |       |                         |        |
| 3          | 1.252          |                |             | 903008                | 121461       |                |       |                         |        |
| 4          | 2.146          |                |             | 12992                 | 2196         |                |       |                         |        |
| 5          | 2.627          |                |             | 1250                  | 327          |                |       |                         |        |
| 6          | 2.731          |                |             | 4860                  | 805          |                |       |                         |        |
| 7          | 3.236          |                |             | 3951                  | 1052         |                |       |                         |        |
| 8          | 3.352          |                |             | 58034                 | 11935        |                |       |                         |        |
| 9          | 3.757          |                |             | 1832                  | 517          | ***            | 36 ST |                         |        |
| 10         | 3.835          |                |             | 1631                  | 492          |                |       |                         |        |
| 11         | 3.921          |                |             | 6054                  | 1528         |                |       |                         |        |
| 12         | 4.052          |                |             | 7414<br>5780          | 2708<br>2107 |                |       |                         |        |
| 13         | 4.101          |                |             | 5409                  | 1679         |                |       |                         |        |
| 14<br>15   | 4.176          |                |             | 3737                  | 905          |                |       |                         |        |
| 16         | 4.265          |                |             | 1346                  | 477          |                |       |                         |        |
| 17         | 4.362          |                |             | 1060                  | 361          |                |       |                         |        |
| 18         | 4.487          |                |             | 1836                  | 461          |                |       |                         |        |
| 19         | 4.586          |                |             | 2671                  | 623          |                |       |                         |        |
| 20         | 4.688          |                |             | 3428                  | 1201         |                |       |                         |        |
| 21         | 4.883          |                |             | 2746                  | 264          |                |       |                         |        |
| 22         | 5.380          | 5.391          | -0.011      | 474521                | 161320       | 42.8016        |       | Tetrachloro-meta-xylene |        |
| 23         | 5.568          |                |             | 3448                  | 774          |                |       | •                       |        |
| 24         | 5.785          |                |             | 1596                  | 168          |                |       |                         |        |
| 25         | 6.016          |                |             | 3507                  | 875          | _              |       |                         |        |
| 26         | 6.247          |                |             | 4747                  | 1469         | •              |       |                         |        |
| 27         | 6.608          |                |             | 457                   | 142          |                |       |                         |        |
| 28         | 7.031          |                |             | 2498                  | 666          |                |       |                         |        |
| 29         | 7.308          |                |             | 610                   | 61           |                |       |                         |        |
| 30         | 7.446          |                |             | 235                   | 83           |                |       |                         |        |
| 31         | 7.550          |                |             | 3932                  | 1323         |                |       |                         |        |
| 32         | 7.812          |                |             | 540                   | 119          |                |       |                         |        |
| 33         | 8.452          |                |             | 763                   | 198          |                |       |                         |        |
| 34         | 8.523          |                |             | 3925                  | 809          |                |       |                         |        |
| 35         | 8.678          |                |             | 970                   | 287          |                |       |                         |        |
| 36         | 9.086          |                |             | 2274                  | 316          |                |       |                         |        |
| 37         | 9.279          |                |             | 876                   | 171<br>525   |                |       |                         |        |
| 38<br>39   | 9.450<br>9.532 |                |             | 1983<br>5 <b>48</b> 9 | 950          |                |       |                         |        |
| 40         | 9.532          |                |             | 570                   | 120          |                |       |                         |        |
| 41         | 10.294         |                |             | 1228                  | 330          |                |       |                         |        |
| 42         | 11.023         |                |             | 3834                  | 1038         |                |       |                         |        |
| 43         | 11.247         |                |             | 333                   | 79           |                |       |                         |        |
| 44         | 11.383         |                |             | 14440                 | 2536         |                |       |                         |        |
| 45         | 12.316         |                |             | 853                   | 224          |                |       |                         |        |
| 46         | 13.007         | 13.056         | -0.049      | 2411                  | 434          | 1.94175        | a     | BZ#66                   |        |
| 47         | 13.384         |                |             | 1249                  | 171          |                |       |                         |        |
| 48         | 14.076         |                |             | 2866                  | 165          |                |       |                         |        |
| 49         | 15.406         |                |             | 4830                  | 768          |                |       |                         |        |
| 50         | 16.450         |                |             | 4440                  | 92           |                |       |                         |        |
| 51         | 17.727         |                |             | 2556                  | 528          |                |       |                         |        |
| 52         | 17.962         |                |             | 1341                  | 183          |                |       |                         |        |
| 53         | 18.259         |                |             | 2199                  | 276          |                |       |                         |        |
| 54         | 18.585         |                |             | 960                   | 50           |                |       |                         |        |
| 55         | 19.199         |                |             | 28378                 | 3124         | 0144           |       |                         |        |

|       |         |          |        |         |         | Extract  |       |                     |
|-------|---------|----------|--------|---------|---------|----------|-------|---------------------|
| Peak  | Peak    | Expected | Delta  |         |         | Conc.    |       |                     |
| No.   | RT      | RT       | RT     | Area    | Height  | (ppb)    | Flags | Peak Identification |
| ====  | ======= |          |        | ======= | ======= | *****    | ===== |                     |
| 56    | 19.764  |          |        | 8308    | 731     |          |       |                     |
| 57    | 19.990  |          |        | 4293    | 706     |          |       |                     |
| 58    | 20.185  |          |        | 3255    | 295     |          |       | • 9                 |
| 59    | 21.896  |          |        | 758     | 170     |          |       | • 17                |
| 60    | 22.446  |          |        | 1031    | 202     |          |       |                     |
| 61    | 22.765  |          |        | 834     | 147     |          |       |                     |
| 62    | 23.069  | 23.115   | -0.047 | 1159    | 240     | 0.549484 | a     | BZ#180              |
| 63    | 23.379  |          |        | 945     | 97      |          |       |                     |
| 64    | 23.913  |          |        | 852     | 157     |          |       |                     |
| 65    | 24.301  |          |        | 3749    | 553     |          |       |                     |
| \$ 66 | 24.652  | 24.678   | -0.027 | 543109  | 100475  | 42.1936  |       | BZ#198              |
| 67    | 24.980  | 25.004   | -0.024 | 3665    | 430     | 0.947962 | a     | BZ#170              |
| 68    | 25.835  |          |        | 929     | 132     |          |       |                     |
| 69    | 26.376  |          |        | 1866    | 367     |          |       |                     |
| 70    | 26.531  |          |        | 2072    | 222     |          |       |                     |
| 71    | 27.626  |          |        | 640     | 23      |          |       |                     |
| 72    | 27.946  |          |        | 5540    | 527     |          |       |                     |
| 73    | 28.402  |          |        | 5885    | 518     |          |       |                     |
| 74    | 28.812  |          |        | 813     | 60      |          |       |                     |
| 75    | 29.096  |          |        | 739     | 123     |          |       |                     |
| 76    | 29.453  |          |        | 667     | 109     |          |       |                     |
| 77    | 29.885  |          |        | 1794    | 243     |          |       |                     |
| 78    | 30.067  |          |        | 3087    | 517     |          |       |                     |
| 79    | 30.601  |          |        | 2020    | 159     |          |       |                     |
| 80    | 30.736  |          |        | 2251    | 393     | •        | v =   |                     |
| 81    | 30.885  |          |        | 2170    | 423     |          |       |                     |
| 82    | 31.470  |          |        | 2667    | 239     |          |       |                     |
| 83    | 31.862  |          |        | 10310   | 1632    |          |       |                     |
| 84    | 32.297  |          |        | 4125    | 143     |          |       |                     |
| 85    | 32.408  |          |        | 20623   | 3631    |          |       |                     |
| 86    | 32.875  |          |        | 12899   | 935     |          |       |                     |
| 87    | 33.110  |          |        | 10316   | 756     |          |       |                     |
| 88    | 33.270  |          |        | 3524    | 648     |          |       |                     |
| 89    | 33.359  |          |        | 6315    | 758     |          |       |                     |
| 90    | 33.567  |          |        | 16438   | 1581    |          |       |                     |
| 91    | 33.997  |          |        | 5763    | 637     |          |       |                     |
| 92    | 34.604  |          |        | 9941    | 1246    |          |       |                     |
| 93    | 35.083  |          |        | 1786    | 270     |          |       |                     |
| 94    | 35.265  |          |        | 2871    | 342     |          |       |                     |
| 95    | 35.394  |          |        | 5613    | 1052    |          |       |                     |
| 96    | 35.520  |          |        | 4186    | 657     |          |       |                     |
| 97    | 36.797  |          |        | 1163    | 179     |          |       |                     |
| 98    | 37.213  |          |        | 11074   | 1448    |          |       |                     |
| 99    | 37.909  |          |        | 993     | 151     |          |       |                     |
| 100   | 39.007  |          |        | 2885    | 527     |          |       |                     |
| 101   | 39.519  |          |        | 31529   | 3562    |          |       |                     |
| 102   | 39.847  |          |        | 2500    | 334     |          |       |                     |
|       |         |          |        |         |         |          |       |                     |

Flags: A - Peak quantitates above calibration range

U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

| T    |    | Compounds |
|------|----|-----------|
| lard | 25 | Compounds |
|      |    |           |

| Peak<br>RT | Expected<br>RT | Target Compound                         |
|------------|----------------|-----------------------------------------|
| =======    |                | ======================================= |
| 5.380      | 5.391          | Tetrachloro-meta-xylene                 |
|            | €.592          | BZ#8                                    |
|            | 7.698          | BZ#18                                   |
|            | 9.137          | BZ#28                                   |
|            | 10.341         | BZ#52                                   |
|            | 11.312         | B2#44                                   |
| 13.007     | 13.056         | BZ#66                                   |
|            | 13.914         | BZ#100145                               |

a - Peak quantitates below reporting limit

H - User selected alternate compound hit

M - Peak manually integrated or manually identified

R - Peak fails recovery

STL Burlington - Target GC Injection Report

| Peak   | Expected |                 |
|--------|----------|-----------------|
| RT     | RT       | Target Compound |
|        | ======   |                 |
|        | 16.080   | BZ#77           |
|        | 17.075   | BZ#118          |
|        | 17.995   | BZ#153          |
|        | 18.720   | BZ#105          |
|        | 19.713   | BZ#138          |
|        | 20.225   | BZ#126          |
|        | 21.462   | BZ#128          |
| 23.069 | 23.115   | BZ#180          |
| 24.652 | 24.678   | BZ#198          |
| 24.980 | 25.004   | BZ#170          |
|        | 27.203   | BZ#195          |
|        | 29.805   | BZ#206          |
|        | 30.754   | BZ#209          |

#### FORM 1 OTHER ORGANICS ANALYSIS DATA SHEET

ENVNET SAMPLE NO.

F01009LS61

Contract: 22000 Lab Name: STL BURLINGTON

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

Matrix: (soil/water) SOIL Lab Sample ID: 502121

Sample wt/vol: 30.1 (g/mL) G Lab File ID: 030CT021608-R241

% Moisture: 34 decanted: (Y/N) N Date Received: 09/25/02

Extraction: (SepF/Cont/Sonc) SOXH Date Extracted: 09/26/02

Concentrated Extract Volume: 10 (mL) Date Analyzed: 10/04/02

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS: CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG Q 34883-43-7----BZ#8 2.5 U

37680-65-2----BZ#18 2.5 U 7012-37-5----BZ#28 2.5 U 41464-39-5----BZ#44 2.5 U 35693-99-3----BZ#52 2.5 U 32598-10-0----BZ#66 2.5 U 32598-13-3----BZ#77 2.5 U 37680-73-2----BZ#101 2.5 U 32598-14-4----BZ#105 2.5 U 31508-00-6----BZ#118 2.5 T 57465-28-8----BZ#126 2.5 U 38380-07-3----BZ#128 2.5 U 35065-28-2----BZ#138 2.5 U 35065-27-1----BZ#153 2.5 U 35065-30-6----BZ#170 2.5 U 35065-29-3----BZ#180 2.5 U 52663-68-0----BZ#187 2.5 U 52663-78-2----BZ#195 2.5 U 40186-72-9----BZ#206 2.5 U 2051-24-3----BZ#209 2.5 U

FORM I OTHER

| •-                    |                                                                    |     | 1,0               |                              | 1.5-              |                                                    |                               |         |
|-----------------------|--------------------------------------------------------------------|-----|-------------------|------------------------------|-------------------|----------------------------------------------------|-------------------------------|---------|
| 1 2                   | (1,017)<br>(1,655)<br>(2,655)                                      |     | (1,213)           |                              |                   |                                                    |                               |         |
| 3-                    | (2,640)<br>(2,640)<br>(3,926)<br>(3,927)<br>(3,927)                |     |                   |                              |                   |                                                    |                               |         |
|                       | (1.558)<br>(4.558)<br>(4.695)                                      |     |                   | Tebrashlara-neta-xylena-(5,/ | <b>101</b> )      |                                                    |                               |         |
| 6-                    | 在 1427                                                             |     |                   |                              |                   | Column<br>Integra<br>Method<br>Report              | Matrix<br>Analyst             | Lab     |
| 7 8                   | 元 (7.036)<br>哲:第33<br>元 (88)                                       |     |                   |                              |                   | Column Integrator Method Reported                  | Matrix<br>Analyst             | Sample  |
| 9-                    | 10, 500<br>10, 876)<br>579, 255)<br>579, 643)                      |     |                   |                              |                   | l or                                               | 3<br>†                        |         |
| 10 11                 | <b>≥</b> -(10,336)                                                 |     |                   |                              |                   | <br>⊢∕घ¤                                           | <br>დ ს                       | ID: 5   |
| 12                    | (11.66)<br>(12.435)                                                |     |                   |                              |                   | RTX-5 Falcon /var/ch 17-Oct-                       | SOIL                          | 50212   |
| 13-                   | t12,879)<br>(13,462)<br>(15,495)<br>(15,495)                       |     |                   |                              |                   | - FB - 1                                           | <u>.</u>                      | 1       |
| 15.                   | <b>⊵</b> (14,628)                                                  |     |                   |                              |                   | 3327<br>2 09                                       |                               |         |
| 16 17                 | (16,007)<br>(16,281)                                               |     |                   |                              |                   | 1<br>1<br>4<br>6                                   |                               |         |
| 18                    | CG7, 3477<br>EZ8126 (47,733)<br>FG8 (25)<br>GG8, 2257<br>GG8, 2257 |     |                   |                              | HultiChrom        | Data Compo                                         | San<br>Inj                    | CLi     |
| 19 20 :<br>Time (Hin) | 119.141)<br>119.5343                                               |     |                   |                              | ន                 | । इन्या                                            | Sample Typ<br>Injection       | Client  |
| 22-                   | 121.462) =                                                         |     |                   |                              | 03oct021608, i241 | <b>U</b>                                           | P .                           | Sample  |
| 22 23                 |                                                                    |     | ——BZ#198 (22,548) |                              | 1241              | Sublist<br>30CT021                                 | pe<br>Date<br>Factor          | le ID   |
| 24                    | 123,714)                                                           |     |                   |                              |                   | 608.                                               | : SAMP<br>: 04-0              | ): F010 |
| 26 26                 | 1(25,662)                                                          |     |                   |                              |                   | oct0;<br>VNET<br>b/320                             | MPLE                          | 10091   |
| 27 28                 | (27.642)                                                           |     |                   |                              |                   | 03oct021608-r241.d<br>ENVNET<br>8.b/32CONG_3327RTX | SAMPLE<br>04-OCT-2002<br>1.00 | 09LS61  |
| 29                    | (29,149)                                                           |     |                   |                              |                   | 3327                                               | 17:11                         |         |
| 30 31                 | (30,523)<br>(E0,903)                                               |     |                   |                              |                   | 1.d<br>RTX5_                                       | 11                            |         |
| 32                    | (1313)<br>(1313)<br>(1313)                                         |     |                   |                              |                   | :t021608-r241.d<br>ET<br>32CONG_3327RTX5_RAW.m     |                               |         |
| 33 34                 | 133,505)                                                           |     |                   |                              |                   | 3                                                  |                               |         |
| <b>ы</b> -            | (34,702)<br>(35,267)<br>(36,673)                                   |     |                   |                              |                   |                                                    |                               |         |
| 36 37                 | <b>持經</b>                                                          | 1 * |                   |                              |                   |                                                    |                               |         |
| 38                    | (37,475)<br>(37,854)                                               |     |                   |                              |                   |                                                    |                               |         |
| 39                    |                                                                    |     | 0148              | R                            |                   |                                                    |                               |         |
| *                     | *                                                                  |     |                   | <del></del>                  |                   |                                                    |                               |         |

Lab Sample ID: 502121 Client Sample ID: F01009LS61

Matrix : SOIL Sample Type : SAMPLE

Analyst : w Instrument : 3327\_1.i Injection Date : 04-OCT-2002 17:11

Dilution Factor: 1.00

Column : RTX-5 Data File : 03oct021608-r241.d

Integrator : Falcon Compound Sublist: ENVNET

: /var/chem/3327\_1.i/100302\_1/030CT021608.b/32CONG\_3327RTX5\_RAW.m Method

Peaks

Reported : 17-Oct-2002 09:46 rrm

| Peak     | Peak           | Expected | Delta  |                  |              | Extract<br>Conc. |       |                         |
|----------|----------------|----------|--------|------------------|--------------|------------------|-------|-------------------------|
| No.      | RT             | RT       | RT     | Area             | Height       | (dqq)            | Flags | Peak Identification     |
| 1        | 1.017          | ****     |        | 3.60330          | *======      | ========         | ===== | ****************        |
| 2        | 1.213          |          |        | 169328<br>554992 | 15552        |                  |       |                         |
| 3        | 1.855          |          |        | 3235             | 73576<br>556 |                  |       |                         |
| 4        | 2.106          |          |        | 539              | 172          |                  |       |                         |
| 5        | 2.250          |          |        | 2497             | 707          |                  |       |                         |
| 6        | 2.323          |          |        | 2363             | 628          |                  |       |                         |
| 7        | 2.640          |          |        | 3068             | 579          |                  |       |                         |
| 8        | 2.926          |          |        | 21754            | 5867         |                  |       |                         |
| 9        | 3.106          |          |        | 17120            | 3691         | ii               |       |                         |
| 10       | 3.272          |          |        | 18577            | 3333         |                  |       |                         |
| 11       | 3.411          |          |        | 6194             | 1471         |                  |       |                         |
| 12       | 3.589          |          |        | 3773             | 1095         |                  |       |                         |
| 13       | 3.731          |          |        | 25120            | 5238         |                  |       |                         |
| 14       | 3.912          |          |        | 17161            | 5605         |                  |       |                         |
| 15       | 3.970          |          |        | 15085            | 5005         |                  |       |                         |
| 16       | 4.063          |          |        | 12071            | 3046         |                  |       |                         |
| 17       | 4.201          |          |        | 727              | 335          |                  |       |                         |
| 18       | 4.267          |          |        | 6425             | 1762         |                  |       |                         |
| 19       | 4.398          |          |        | 7012             | 2722         |                  |       |                         |
| 20       | 4.695          |          |        | 2018             | 821          |                  |       |                         |
| 21       | 5.001          | 5.001    | 0.000  | 364557           | 145766       | 46.2426          |       | Tetrachloro-meta-xylene |
| 22       | 5.178          |          |        | 5109             | 1070         |                  |       |                         |
| 23       | 5.413          |          |        | 811              | 153          |                  |       |                         |
| 24       | 5.582          |          |        | 4677             | 1485         |                  |       |                         |
| 25       | 5.868          |          |        | 1021             | 305          |                  |       |                         |
| 26       | 6.040          |          |        | 494              | 173          |                  |       |                         |
| 27       | 6.331          |          |        | 724              | 166          |                  |       |                         |
| 28       | 6.552          |          |        | 4175             | 1163         |                  |       |                         |
| 29       | 7.036          |          |        | 7551             | 2353         |                  |       |                         |
| 30       | 7.253          |          |        | 594              | 173          |                  |       |                         |
| 31<br>32 | 7.399          |          |        | 921              | 313          |                  |       |                         |
| 33       | 7.765          |          |        | 4389             | 832          |                  |       |                         |
| 34       | 7.953          |          |        | 3546             | 1025         |                  |       |                         |
| 35       | 8.084<br>8.477 |          |        | 2089             | 588          |                  |       |                         |
| 36       | 8.543          |          |        | 972              | 326          |                  |       |                         |
| 37       | 8.605          |          |        | 1428<br>2898     | 476          |                  |       |                         |
| 38       | 8.876          |          |        | 544              | 732<br>106   |                  |       |                         |
| 39       | 9.255          |          |        | 5354             | 820          |                  |       |                         |
| 40       | 9.643          |          |        | 3304             | 657          |                  |       |                         |
| 41       | 10.336         |          |        | 12064            | 2952         |                  |       |                         |
| 42       | 11.604         |          |        | 2471             | 578          |                  |       |                         |
| 43       | 11.786         |          |        | 967              | 253          |                  |       |                         |
| 44       | 12.435         |          |        | 5335             | 943          |                  |       |                         |
| 45       | 12.879         |          |        | 487              | 116          |                  |       |                         |
| 46       | 13.462         |          |        | 5111             | 445          |                  |       |                         |
| 47       | 13.686         |          |        | 1776             | 354          |                  |       |                         |
| 48       | 13.772         | 13.752   | 0.020  | 3494             | 744          | 3.39925          | a     | BZ#77                   |
| 49       | 13.947         |          |        | 1019             | 192          |                  |       | <b></b> .               |
| 50       | 14.036         |          |        | 1695             | 267          |                  |       |                         |
| 51       | 14.628         |          |        | 7076             | 1399         |                  |       |                         |
| 52       | 16.007         |          |        | 1527             | 159          |                  |       |                         |
| 53       | 16.281         |          |        | 31760            | 3250         |                  |       |                         |
| 54       | 17.317         |          |        | 1432             | 172          |                  |       |                         |
| 55       | 17.733         | 17.762   | -0.029 | 1131             |              | 149°91           |       | BZ#126                  |

| Peak  | Peak    | Expected | Delta   |        |        | Extract<br>Conc. |       |        |                     |
|-------|---------|----------|---------|--------|--------|------------------|-------|--------|---------------------|
| No.   | RT      | RT       | RT      | Area   | Height | (ppb)            | Flags |        | Peak Identification |
| ===== | ======= | X2=====  | ======= |        | mergne | (Ppb)            |       |        |                     |
| 56    | 18.015  |          |         | 2907   | 466    |                  |       |        |                     |
| 57    | 18.225  |          |         | 484    | 114    |                  |       |        |                     |
| 58    | 18.516  |          |         | 2101   | 250    |                  |       |        |                     |
| 59    | 19.141  |          |         | 874    | 147    |                  |       |        | •                   |
| 60    | 19.141  |          |         |        | 205    |                  |       |        |                     |
|       |         |          |         | 1067   |        |                  |       |        |                     |
| 61    | 19.784  |          |         | 1944   | 310    |                  |       |        |                     |
| 62    | 20.447  |          |         | 2948   | 321    |                  |       |        |                     |
| 63    | 20.775  |          |         | 2773   | 269    |                  |       |        |                     |
| 64    | 21.462  |          |         | 1003   | 201    |                  |       |        |                     |
| 65    | 21.949  |          |         | 2053   | 217    |                  |       |        |                     |
| \$ 66 | 22.548  | 22.559   | -0.011  | 350184 | 69002  | 46.3517          |       | BZ#198 |                     |
| 67    | 23.370  |          |         | 1774   | 349    |                  |       |        |                     |
| 68    | 23.714  |          |         | 1053   | 152    |                  |       |        |                     |
| 69    | 24.647  |          |         | 1738   | 296    |                  |       |        |                     |
| 70    | 25.232  |          |         | 3903   | 389    |                  |       |        |                     |
| 71    | 25.662  |          |         | 2138   | 258    |                  |       |        |                     |
| 72    | 26.906  |          |         | 1238   | 165    |                  |       |        |                     |
| 73    | 27.642  |          |         | 2587   | 271    |                  |       |        |                     |
| 74    | 27.895  |          |         | 1358   | 235    |                  |       |        |                     |
| 75    | 28.063  |          |         | 849    | 159    |                  |       |        |                     |
| 76    | 28.336  |          |         | 3545   | 697    |                  |       |        |                     |
| 77    | 28.502  |          |         | 1359   | 239    |                  |       |        |                     |
| 78    | 29.149  |          |         | 2556   | 206    |                  |       |        |                     |
| 79    | 29.570  |          |         | 2498   | 142    | •                | . 0   |        |                     |
| 80    | 29.719  |          |         | 269    | 38     |                  |       |        |                     |
| 81    | 29.839  |          |         | 6375   | 1061   |                  |       |        |                     |
| 82    | 30.523  |          |         | 15001  | 1802   |                  |       |        |                     |
| 83    | 30.903  |          |         | 753    | 75     |                  |       |        |                     |
| 84    | 31.317  |          |         | 558    | 25     |                  |       |        |                     |
| 85    | 31.499  |          |         | 429    | 98     |                  |       |        |                     |
| 86    | 31.623  |          |         | 359    | 102    |                  |       |        |                     |
| 87    | 31.740  |          |         | 7637   | 896    |                  |       |        |                     |
| 88    | 31.991  |          |         | 344    | 93     |                  |       |        |                     |
| 89    | 32.100  |          |         | 649    | 142    |                  |       |        |                     |
| 90    | 32.228  |          |         | 17341  | 4856   |                  |       |        |                     |
| 91    | 32.572  |          |         | 1542   | 335    |                  |       |        |                     |
| 92    | 32.793  |          |         | 12567  | 1497   |                  |       |        |                     |
| 93    | 33.028  |          |         | 3506   | 612    |                  |       |        |                     |
| 94    | 33.152  |          |         | 8439   | 1045   |                  |       |        |                     |
| 95    | 33.299  |          |         | 4942   | 731    |                  |       |        |                     |
| 96    | 33.505  |          |         | 25862  | 3628   |                  |       |        |                     |
| 97    | 34.126  |          |         | 3020   | 379    |                  |       |        |                     |
| 98    | 34.702  |          |         | 9828   | 1339   |                  |       |        |                     |
| 99    | 35.267  |          |         | 5023   | 476    |                  |       |        |                     |
| 100   | 35.498  |          |         | 4678   | 573    |                  |       |        |                     |
| 101   | 35.673  |          |         | 12541  | 1077   |                  |       |        |                     |
| 102   | 36.602  |          |         | 1910   | 319    |                  |       |        |                     |
| 103   | 36.748  |          |         | 1142   | 208    |                  |       |        |                     |
| 104   | 36.876  |          |         | 1081   | 152    |                  |       |        |                     |
| 105   | 37.067  |          |         | 1503   | 208    |                  |       |        |                     |
| 106   | 37.475  |          |         | 1052   | 185    |                  |       |        |                     |
| 107   | 37.854  |          |         | 927    | 171    |                  |       |        |                     |
| 108   | 39.069  |          |         | 1745   | 286    |                  |       |        |                     |
| 109   | 39.226  |          |         | 1161   | 189    |                  |       |        |                     |

Flags: A - Peak quantitates above calibration range

.

67 0150

a - Peak quantitates below reporting limit

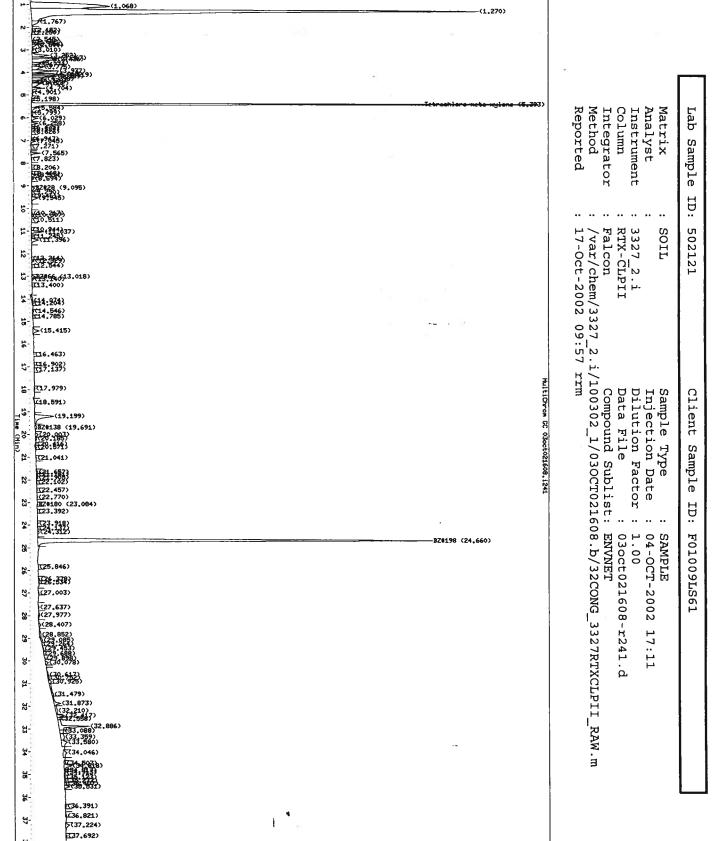
H - User selected alternate compound hit

M - Peak manually integrated or manually identified

R - Peak fails recovery
U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

| Peak    | Expected |                 |  |
|---------|----------|-----------------|--|
| RT      | RT       | Target Compound |  |
| ======= | =======  |                 |  |
| <br>    | T        | arget Compounds |  |

| Peak    | Expected |                                         |
|---------|----------|-----------------------------------------|
| RT      | RT       | Target Compound                         |
| ======= |          | *====================================== |
| 5.001   | 5.001    | Tetrachloro-meta-xylene                 |
|         | 5.761    | BZ#8                                    |
|         | 6.701    | BZ#18                                   |
|         | 7.925    | BZ#28                                   |
|         | 8.984    | BZ#52                                   |
|         | 9.667    | BZ#44                                   |
|         | 11.243   | BZ#66                                   |
|         | 12.207   | BZ#101                                  |
| 13.772  | 13.752   | BZ#77                                   |
|         | 14.938   | BZ#118                                  |
|         | 15.993   | BZ#153                                  |
|         | 16.155   | BZ#105                                  |
|         | 17.328   | BZ#138                                  |
| 17.733  | 17.762   | BZ#126                                  |
|         | 18.647   | BZ#128                                  |
|         | 20.781   | BZ#180                                  |
|         | 22.271   | BZ#170                                  |
| 22.548  | 22.559   | BZ#198                                  |
|         | 24.552   | BZ#195                                  |
|         | 27.655   | BZ#206                                  |
|         | 29.180   | BZ#209                                  |
|         |          |                                         |



0152

1.2

14

1.3-

0.7-

8

39

8-

<u>۾</u>

(38,109) (38,373) (38,987)

(39,410)

39,860>

(40,753)

Lab Sample ID: 502121 Client Sample ID: F01009LS61

Matrix : SOIL Sample Type : SAMPLE

Injection Date : 04-OCT-2002 17:11 Analyst

Instrument : 3327 2.i Dilution Factor: 1.00

Column : RTX-CLPII : 03oct021608-r241.d Data File

Integrator : Falcon Compound Sublist: ENVNET

: /var/chem/3327\_2.i/100302\_1/030CT021608.b/32CONG\_3327RTXCLPII\_RAW.m Method

Peaks \_

Reported : 17-Oct-2002 09:57 rrm

| eak      | Peak           | Expected | Delta  |              |                      | Extract<br>Conc. |       |                                         |  |
|----------|----------------|----------|--------|--------------|----------------------|------------------|-------|-----------------------------------------|--|
| No.      | RT             | RT       | RT     | Area         | Height               | (ppb)            | Flags | Peak Identification                     |  |
|          | ======         |          |        | =======      | =======              | ========         |       | ======================================= |  |
| 1        | 1.068          |          |        | 250003       | 20948                |                  |       |                                         |  |
| 2        | 1.270          |          |        | 953092       | 119057               |                  |       |                                         |  |
| 3        | 1.767          |          |        | 14977        | 1836                 |                  |       |                                         |  |
| 4        | 2.152          |          |        | 1587         | 362                  |                  |       |                                         |  |
| 5        | 2.250          |          |        | 951          | 255                  |                  |       |                                         |  |
| 6<br>7   | 2.545          |          |        | 641          | 63                   |                  |       |                                         |  |
| 8        | 2.642<br>2.744 |          |        | 1495         | 417                  |                  |       |                                         |  |
| 9        | 2.744          |          |        | 2506         | 879                  | -                |       |                                         |  |
| 10       | 3.010          |          |        | 6389<br>1474 | 1078<br>3 <b>4</b> 2 | -                | -     |                                         |  |
| 11       | 3.252          |          |        | 21437        | 4512                 |                  |       |                                         |  |
| 12       | 3.367          |          |        | 25298        | 7136                 |                  |       |                                         |  |
| 13       | 3.436          |          |        | 37782        | 6420                 |                  |       |                                         |  |
| 14       | 3.593          |          |        | 11195        | 2336                 |                  |       |                                         |  |
| 15       | 3.677          |          |        | 4432         | 1300                 |                  |       |                                         |  |
| 16       | 3.775          |          |        | 16412        | 2891                 |                  |       |                                         |  |
| 17       | 3.937          |          |        | 27397        | 6940                 |                  |       |                                         |  |
| 18       | 4.068          |          |        | 13877        | 6020                 |                  |       |                                         |  |
| 19       | 4.119          |          |        | 27831        | 8723                 |                  |       |                                         |  |
| 20       | 4.189          |          |        | 19712        | 6464                 |                  |       |                                         |  |
| 21       | 4.298          |          |        | 15390        | 3776                 |                  |       |                                         |  |
| 22       | 4.378          |          |        | 5428         | 1842                 |                  |       |                                         |  |
| 23       | 4.471          |          |        | 2437         | 1033                 |                  |       |                                         |  |
| 24       | 4.502          |          |        | 14833        | 2436                 |                  |       |                                         |  |
| 25       | 4.704          |          |        | 10416        | 3396                 |                  |       |                                         |  |
| 26       | 4.901          |          |        | 2194         | 331                  | •                |       |                                         |  |
| 27       | 5.198          |          |        | 725          | 191                  |                  |       |                                         |  |
| 28       | 5.393          | 5.391    | 0.002  | 506472       | 171401               | 45.4367          |       | Tetrachloro-meta-xylene                 |  |
| 29       | 5.584          |          |        | 7310         | 1384                 |                  |       | 4                                       |  |
| 30       | 5.799          |          |        | 3955         | 445                  |                  |       |                                         |  |
| 31       | 6.029          |          |        | 8362         | 1803                 |                  |       |                                         |  |
| 32       | 6.258          |          |        | 6324         | 1731                 |                  |       |                                         |  |
| 33       | 6.435          |          |        | 501          | 140                  |                  |       |                                         |  |
| 34       | 6.524          |          |        | 738          | 215                  |                  |       |                                         |  |
| 35       | 6.626          |          |        | 984          | 181                  |                  |       |                                         |  |
| 36       | 6.947          |          |        | 212          | 75                   |                  |       |                                         |  |
| 37       | 7.045          |          |        | 4954         | 1286                 |                  |       |                                         |  |
| 38       | 7.271          |          |        | 794          | 134                  |                  |       |                                         |  |
| 39       | 7.565          |          |        | 8884         | 2628                 |                  |       |                                         |  |
| 40       | 7.823          |          |        | 1296         | 209                  |                  |       |                                         |  |
| 41<br>42 | 8.206          |          |        | 1426         | 190                  |                  |       |                                         |  |
| 42       | 8.468<br>8.534 |          |        | 1359         | 329                  |                  |       |                                         |  |
| 44       | 8.694          |          |        | 4879<br>2297 | 1126                 |                  | 1.7   |                                         |  |
| 45       | 9.095          | 9.137    | -0.042 | 5044         | 648<br>856           | 1 56556          | _     | D7#00                                   |  |
| 46       | 9.290          | 2.131    | -0.042 | 1052         | 856<br>192           | 1.56556          | a     | BZ#28                                   |  |
| 47       | 9.461          |          |        | 1967         | 441                  |                  |       |                                         |  |
| 48       | 9.545          |          |        | 9477         | 1549                 |                  |       |                                         |  |
| 49       | 10.217         |          |        | 1624         | 253                  |                  |       |                                         |  |
| 50       | 10.307         |          |        | 2384         | 649                  |                  |       |                                         |  |
| 51       | 10.511         |          |        | 1062         | 136                  |                  |       |                                         |  |
| 52       | 10.944         |          |        | 538          | 169                  |                  |       |                                         |  |
| 53       | 11.037         |          |        | 12327        | 3244                 |                  |       |                                         |  |
| 54       | 11.245         |          |        | 1237         | - 237                |                  |       |                                         |  |
|          |                |          |        |              | - 1884               |                  |       |                                         |  |

|             |                  |                |             |                |             | Extract        |       |         |      |             |           |
|-------------|------------------|----------------|-------------|----------------|-------------|----------------|-------|---------|------|-------------|-----------|
| Peak<br>No. | Peak<br>RT       | Expected<br>RT | Delta<br>RT | Area           | Height      | Conc.<br>(ppb) | Flags |         | Peak | Identificat | ion       |
|             | =======          |                |             |                |             |                | ====  |         |      |             | ========= |
| 56<br>57    | 12.214<br>12.329 |                |             | 472<br>2397    | 122<br>608  |                |       |         |      |             |           |
| 5 <i>7</i>  | 12.544           |                |             | 845            | 226         |                |       |         |      |             |           |
| 59          | 13.018           | 13.056         | -0.038      | 4104           | 942         | 2.24916        | a     | BZ#66   | (4)  |             |           |
| 60          | 13.140           |                |             | 1945           | 435         |                |       |         |      |             |           |
| 61          | 13.400           |                |             | 1197           | 186         |                |       |         |      |             |           |
| 62          | 14.074           |                |             | 5269           | 304         |                |       |         |      |             |           |
| 63          | 14.204           |                |             | 2135           | 271         |                |       |         |      |             |           |
| 64          | 14.546           |                |             | 2877           | 367         |                |       |         |      |             |           |
| 65          | 14.785           |                |             | 1265           | 188         |                |       |         |      |             |           |
| 66<br>67    | 15.415<br>16.463 |                |             | 10913<br>481   | 1668<br>100 |                |       |         |      |             |           |
| 68          | 16.902           |                |             | 569            | 116         |                |       |         |      |             |           |
| 69          | 17.137           |                |             | 1309           | 189         |                |       |         |      |             |           |
| 70          | 17.979           |                |             | 2175           | 253         |                |       |         |      |             |           |
| 71          | 18.591           |                |             | 1454           | 75          |                |       |         |      |             |           |
| 72          | 19.199           |                |             | 40554          | 4938        |                |       |         |      |             |           |
| 73          | 19.691           | 19.713         | -0.022      | 5203           | 461         | 0.468848       | a     | BZ#138  |      |             |           |
| 74          | 20.003           |                |             | 4970           | 758         |                |       |         |      |             |           |
| 75<br>76    | 20.185           |                |             | 3109<br>1777   | 354<br>348  |                |       |         |      |             |           |
| 76<br>77    | 20.416<br>20.571 |                |             | 2082           | 348         |                |       |         |      |             |           |
| 78          | 21.041           |                |             | 1144           | 162         |                |       |         |      |             |           |
| 79          | 21.657           |                |             | 2765           | 376         |                |       |         |      |             |           |
| 80          | 21.761           |                |             | 1876           | 324         |                | 888   |         |      |             |           |
| 81          | 21.905           |                |             | 2595           | 385         |                |       |         |      |             |           |
| 82          | 22.102           |                |             | 1099           | 164         |                |       |         |      |             |           |
| 83          | 22.457           |                |             | 1094           | 215         |                |       |         |      |             |           |
| 84          | 22.770           | 00 115         | 0 001       | 1832           | 194         | 0.544003       | _     | 2001200 |      |             |           |
| 85<br>86    | 23.084<br>23.392 | 23.115         | -0.031      | 1107<br>509    | 228<br>94   | 0.544203       | a     | BZ#180  |      |             |           |
| 87          | 23.392           |                |             | 1271           | 232         |                |       |         |      |             |           |
| 88          | 24.137           |                |             | 803            | 186         |                |       |         |      |             |           |
| 89          | 24.312           |                |             | 3345           | 491         |                |       |         |      |             |           |
| \$ 90       | 24.660           | 24.678         | -0.018      | 564167         | 105087      | 44.1377        |       | BZ#198  |      |             |           |
| 91          | 25.846           |                |             | 556            | 97          |                |       |         |      |             |           |
| 92          | 26.378           |                |             | 1752           | 356         |                |       |         |      |             |           |
| 93          | 26.534           |                |             | 1194           | 225         |                |       |         |      |             |           |
| 94<br>95    | 27.003<br>27.637 |                |             | 2195<br>2582   | 204<br>235  |                |       |         |      |             |           |
| 96          | 27.837           |                |             | 4612           | 355         |                |       |         |      |             |           |
| 97          | 28.407           |                |             | 4980           | 488         |                |       |         |      |             |           |
| 98          | 28.852           |                |             | 5643           | 452         |                |       |         |      |             |           |
| 99          | 29.085           |                |             | 3477           | 448         |                |       |         |      |             |           |
| 100         | 29.264           |                |             | 588            | 119         |                |       |         |      |             |           |
| 101         | 29.453           |                |             | 1095           | 200         |                |       |         |      |             |           |
| 102         | 29.688<br>29.898 |                |             | 342<br>1107    | 74<br>209   |                |       |         |      |             |           |
| 103<br>104  | 30.078           |                |             | 5565           | 855         |                |       |         |      |             |           |
| 105         | 30.617           |                |             | 3847           | 332         |                |       |         |      |             |           |
| 106         | 30.752           |                |             | 2175           | 365         |                |       |         |      |             |           |
| 107         | 30.925           |                |             | 5273           | 715         |                |       |         |      |             |           |
| 108         | 31.479           |                |             | 11373          | 436         |                |       |         |      |             |           |
| 109         | 31.873           |                |             | 13171          | 1805        |                |       |         |      |             |           |
| 110         | 32.210           |                |             | 9196           | 498         |                |       |         |      |             |           |
| 111<br>112  | 32.417<br>32.558 |                |             | 8394<br>3822   | 2090<br>650 |                |       |         |      |             |           |
| 113         | 32.886           |                |             | 45424          | 8097        |                |       |         |      |             |           |
| 114         | 33.088           |                |             | 9468           | 1140        |                |       |         |      |             |           |
| 115         | 33.359           |                |             | 15160          | 1036        |                | ••    |         |      |             |           |
| 116         | 33.580           |                |             | 17552          | 1599        |                |       |         |      |             |           |
| 117         | 34.046           |                |             | 12983          | 1125        |                |       |         |      |             |           |
| 118         | 34.507           |                |             | 3380           | 461         |                |       |         |      |             |           |
| 119         | 34.618           |                |             | 12988          | 2003        |                |       |         |      |             |           |
| 120<br>121  | 34.817<br>34.913 |                |             | 1800<br>1 2104 | 347<br>314  |                |       |         |      |             |           |
| 121         | 35.123           |                |             | 1572           | 259         |                |       |         |      |             |           |
| 123         | 35.272           |                |             | 3267           | 411         |                |       |         |      |             |           |
| 124         | 35.407           |                |             | 3416           | 622         |                |       |         |      |             |           |
| 125         | 35.531           |                |             | 7126           | 1342        |                |       |         |      |             |           |
| 126         | 36.391           |                |             | 2323           | - 359       | )154           |       |         |      |             |           |
|             |                  |                |             |                | 2           | , O 1          |       |         |      |             |           |

|       |        |          |       |      |         | Extract  |       |                     |
|-------|--------|----------|-------|------|---------|----------|-------|---------------------|
| Peak  | Peak   | Expected | Delta |      |         | Conc.    |       |                     |
| No.   | RT     | RT       | RT    | Area | Height  | (ppb)    | Flags | Peak Identification |
| ===== |        | =======  |       |      | ======= | ======== | ===== |                     |
| 127   | 36.821 |          |       | 2675 | 321     |          |       |                     |
| 128   | 37.224 |          |       | 8603 | 1003    |          |       |                     |
| 129   | 37.692 |          |       | 2094 | 377     |          |       |                     |
| 130   | 38.109 |          |       | 1027 | 181     |          |       | *                   |
| 131   | 38.373 |          |       | 557  | 108     |          |       |                     |
| 132   | 38.987 |          |       | 654  | 116     |          |       |                     |
| 133   | 39.410 |          |       | 5737 | 384     |          |       |                     |
| 134   | 39.860 |          |       | 1180 | 190     |          |       |                     |
| 135   | 40.753 |          |       | 510  | 92      |          |       |                     |

Flags: A - Peak quantitates above calibration range

a - Peak quantitates below reporting limit

H - User selected alternate compound hit

Reported: 10/17/2002 09:57 rrm

 $\ensuremath{\mathrm{M}}$  - Peak manually integrated or manually identified

R - Peak fails recovery

U - User disabled peak ID: either peak quantitates below reporting limit or

peak identification not confirmed on second column

#### Target Compounds

| Peak   | Expected |                                         |
|--------|----------|-----------------------------------------|
| RT     | RT       | Target Compound                         |
| ====== |          | ======================================= |
| 5.393  | 5.391    | Tetrachloro-meta-xylene                 |
|        | 6.592    | BZ#8                                    |
|        | 7.698    | BZ#18                                   |
| 9.095  | 9.137    | BZ#28                                   |
|        | 10.341   | BZ#52                                   |
|        | 11.312   | BZ#44                                   |
| 13.018 | 13.056   | BZ#66                                   |
|        | 13.914   | BZ#101                                  |
|        | 16.080   | BZ#77                                   |
|        | 17.075   | BZ#118                                  |
|        | 17.995   | BZ#153                                  |
|        | 18.720   | BZ#105                                  |
| 19.691 | 19.713   | BZ#138                                  |
|        | 20.225   | BZ#126                                  |
|        | 21.462   | BZ#128                                  |
| 23.084 | 23.115   | BZ#180                                  |
| 24.660 | 24.678   | BZ#198                                  |
|        | 25.004   | BZ#170                                  |
|        | 27.203   | BZ#195                                  |
|        | 29.805   | BZ#206                                  |
|        | 30.754   | BZ#209                                  |
|        |          |                                         |

# FORM 1 OTHER ORGANICS ANALYSIS DATA SHEET

ENVNET SAMPLE NO.

F01009LS62

Lab Name: STL BURLINGTON Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

Matrix: (soil/water) SOIL Lab Sample ID: 502120

Sample wt/vol: 30.0 (g/mL) G Lab File ID: 030CT021608-R231

% Moisture: 33 decanted: (Y/N) N Date Received: 09/25/02

Extraction: (SepF/Cont/Sonc) SOXH Date Extracted: 09/26/02

Concentrated Extract Volume: 10 (mL) Date Analyzed: 10/04/02

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: \_\_\_ Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG 0 CAS NO. COMPOUND 2.5 U 34883-43-7----BZ#8 2.5 U 37680-65-2----BZ#18 2.5 U 7012-37-5----BZ#28 2.5 U 41464-39-5----BZ#44 2.5 U 35693-99-3----BZ#52 2.5 U 32598-10-0----BZ#66 2.5 U 32598-13-3----BZ#77 2.5 U 37680-73-2----BZ#101 2.5 U 32598-14-4----BZ#105 2.5 U 31508-00-6----BZ#118 2.5 U 57465-28-8----BZ#126 2.5 U 38380-07-3----BZ#128 2.5 U 35065-28-2----BZ#138 2.5 U 35065-27-1----BZ#153 2.5 U 35065-30-6----BZ#170 2.5 U 35065-29-3----BZ#180 2.5 U 52663-68-0----BZ#187 2.5 U 52663-78-2----BZ#195 40186-72-9----BZ#206 2.5 U 2.5 U 2051-24-3----BZ#209

FORM I OTHER

| 0-                  | . 4 a non <b>4</b> ma . 9                   | · · · · · · · · · · · · · · · · · · · |                 | 1.2 may 1.3 may 1.4 m | 1.5                     |                                                                                                      |        |
|---------------------|---------------------------------------------|---------------------------------------|-----------------|-----------------------|-------------------------|------------------------------------------------------------------------------------------------------|--------|
| <u>ь</u>            | (0,893)                                     |                                       |                 |                       |                         |                                                                                                      |        |
| N                   | 17:654)<br>12:498348)                       |                                       |                 |                       |                         |                                                                                                      |        |
| w-                  | (2,924)<br>(2,924)<br>(3,776)               |                                       |                 |                       |                         |                                                                                                      |        |
|                     | Er Si                                       |                                       |                 |                       |                         | •                                                                                                    |        |
| <b>c</b> 9-         | (4.83)<br>/(0.171)<br>(5.63 <del>5</del> 7) |                                       | <u> </u>        | Tetrashiara-neta-nyi  | <del>ene (1,99</del> 6) |                                                                                                      |        |
| 6-                  | ₹ :856}<br>₹ :856)                          |                                       |                 |                       |                         | Mat<br>Ana<br>Ins<br>Col<br>Int<br>Int<br>Met                                                        | Lab    |
| 7                   | -(7,029)                                    |                                       |                 |                       |                         | Matrix Analyst Instrument Column Integrator Method Reported                                          |        |
| œ-                  | 及於計7.947)<br>無限                             |                                       |                 |                       |                         | 0 m 1 ct                                                                                             | Sample |
| -ود                 | 168-8445<br>579-248)                        |                                       |                 |                       |                         | itor                                                                                                 | le     |
| 8-                  | 159,638)<br>5(10,330)                       |                                       |                 |                       |                         |                                                                                                      | ID:    |
| 22-                 | 1714 E98)                                   |                                       |                 |                       |                         | SC<br>RII<br>Fa<br>/v                                                                                | 50     |
| 15⊤                 | 111.588}<br>E(12.433)                       |                                       |                 |                       |                         | SOIL 3327_1. RTX-5 Falcon /var/ch 17-Oct-                                                            | 502120 |
| <u>ٿ</u>            | (12,874)                                    |                                       |                 |                       |                         | 15 .                                                                                                 | 20     |
| *                   | ®2077 (13,777)<br>(14,025)<br>∑(14,626)     |                                       |                 |                       |                         |                                                                                                      |        |
| <b>15</b> -         | 2714.050)                                   |                                       |                 | <del>5-</del> 3- 3    |                         | ω                                                                                                    |        |
| ¥-                  | (16.007)<br>)(16.293)                       |                                       |                 |                       |                         | 27 <u>1</u> .<br>09:46                                                                               |        |
| 17                  | <u>(17,303)</u>                             |                                       |                 |                       |                         | <b>⊢</b> -                                                                                           |        |
| 1 <del>6</del> -    | K18.013)                                    |                                       |                 |                       | HultiChrom              | LLW<br>CC<br>DS<br>DS<br>DS<br>DS<br>DS<br>DS                                                        | C      |
| 19                  | r19.145>                                    |                                       |                 |                       |                         | Sample Typ<br>Injection<br>Dilution F<br>Data File<br>Compound S<br>100302_1/03                      | Client |
| 19 20<br>Time (Hin) | (19.784)<br>(120.442)                       |                                       |                 |                       | GC 0300                 |                                                                                                      | 유      |
| \_<br>\_            | (20,863)                                    |                                       |                 |                       | 102160                  | Type on Dan Facility of Facility of Sul./0300                                                        | Sam    |
| 13-                 | (21,949)                                    |                                       | BZ#198 (22,546) |                       | 03oct021608,i231        | pe<br>Date<br>Factor<br>Sublis                                                                       | Sample |
| 23                  | (T23,381)                                   |                                       | 22370 (22,010)  |                       |                         | Type : SAMI<br>on Date : 04-C<br>on Factor : 1.00<br>le : 03oc<br>d Sublist: ENVN<br>/03OCT021608.b/ | ij     |
| 2                   | (24,645)                                    |                                       |                 | •                     |                         | 00 H C H C K                                                                                         | "      |
| 8-                  | (25,232)<br>(25,665)                        |                                       |                 |                       |                         | SAMP:<br>04-00<br>1.00<br>03oc:<br>ENVNI<br>8.b/:                                                    | F010   |
| 26                  | (26,451)                                    |                                       |                 |                       |                         | SAMPLE<br>04-OCT-1<br>1.00<br>03oct02:<br>ENVNET<br>ENVNET<br>08.b/32C0                              | 9.09   |
| 27                  | (726,899)<br>(727,637)                      |                                       |                 |                       |                         | 0 - 2                                                                                                | 09LS6  |
| 28-                 | 727, 637)<br>1724: 823)<br>723: 434)        |                                       |                 |                       |                         | 002<br>608-                                                                                          | Ν      |
| 29                  | 728,830)<br>(29,140)<br>(29,140)            |                                       |                 |                       |                         | 16:<br>r23<br>327                                                                                    |        |
| 30                  | (30,521)                                    |                                       |                 |                       |                         | 26<br>1.d<br>RTX                                                                                     | 1      |
| 32-                 | (31,002)<br>(34,317)<br>(34,317)            |                                       |                 |                       |                         |                                                                                                      |        |
| ۲ <u>۶</u> -        | 532.(92)226)<br>532.(92)<br>533.(93)        |                                       |                 |                       |                         | RAW.m                                                                                                |        |
| 3                   | (33,500)                                    |                                       |                 |                       |                         | ສ                                                                                                    |        |
| ¥-                  | €34,9273<br>>(34,693)                       |                                       |                 | -                     |                         |                                                                                                      |        |
| я <del>.</del>      | (135,201)<br>(135,491)<br>5(35,750)         |                                       |                 |                       |                         |                                                                                                      |        |
| 36                  | 136.606)                                    | <i>(</i> * • *)                       |                 |                       |                         |                                                                                                      |        |
| 37                  |                                             | 1 ,                                   |                 |                       |                         |                                                                                                      |        |
| #                   |                                             |                                       |                 |                       |                         |                                                                                                      |        |
| 39                  | 533,224)                                    |                                       |                 | · <b>-,</b> "         |                         |                                                                                                      |        |
| 8                   |                                             |                                       | 015             | ) (                   |                         |                                                                                                      |        |
| <b>#</b> -          | ·                                           |                                       |                 |                       |                         |                                                                                                      |        |

Lab Sample ID: 502120 Client Sample ID: F01009LS62

: SAMPLE Matrix : SOIL Sample Type

Analyst : M Instrument : 3327\_1.i Injection Date : 04-OCT-2002 16:26 Analyst

Dilution Factor : 1.00

Column : RTX-5 Data File : 03oct021608-r231.d

Integrator : Falcon Compound Sublist: ENVNET

: /var/chem/3327\_1.i/100302\_1/030CT021608.b/32CONG\_3327RTX5\_RAW.m Method

Peaks

Reported : 17-Oct-2002 09:46 rrm

| Peak | Peak             | Expected | Delta   |             |                | Extract<br>Conc. |       |                         |   |
|------|------------------|----------|---------|-------------|----------------|------------------|-------|-------------------------|---|
| No.  | RT               | RT       | RT      | Area        | Height         | (ppb)            | Flags | Peak Identification     | a |
| ==== |                  |          | ======= | 117649      |                |                  |       |                         |   |
|      | 0.893<br>2 1.210 |          |         | 117649      | 10735<br>13056 |                  |       |                         |   |
|      | 1.674            |          |         | 3845        | 531            |                  |       |                         |   |
|      | 1.851            |          |         | 2216        | 412            |                  |       |                         |   |
|      | 2.108            |          |         | 552         | 140            |                  |       |                         |   |
|      | 5 2.248          |          |         | 15678       | 2925           |                  |       |                         |   |
|      | 7 2.465          |          |         | 1455        | 257            |                  |       |                         |   |
|      | 8 2.587          |          |         | 3782        | 421            |                  |       |                         |   |
|      | 9 2.924          |          |         | 32605       | 8264           | •                | ¥     |                         |   |
| 1    |                  |          |         | 21406       | 4736           |                  |       |                         |   |
| 1    | 1 3.270          |          |         | 31468       | 5387           |                  |       |                         |   |
| 1    | 2 3.407          |          |         | 13955       | 2748           |                  |       |                         |   |
| 1.   | 3 3.584          |          |         | 10518       | 2213           |                  |       |                         |   |
| 1    | 4 3.724          |          |         | 4260        | 1951           |                  |       |                         |   |
| 1    | 5 3.766          |          |         | 9728        | 3019           |                  |       |                         |   |
| 1    | 6 3.908          |          |         | 7678        | 2504           |                  |       |                         |   |
| 1    | 7 3.974          |          |         | 7058        | 2094           |                  |       |                         |   |
| 1    | 8 4.059          |          |         | 6435        | 1503           |                  |       |                         |   |
| 1    | 9 4.263          |          |         | 5057        | 1169           |                  |       |                         |   |
| 2    |                  |          |         | 5014        | 1645           |                  |       |                         |   |
| 2    |                  |          |         | 2057        | 668            |                  |       |                         |   |
| 2    |                  |          |         | 1201        | 197            |                  |       |                         |   |
| 2    |                  | 5.001    | -0.005  | 365888      | 146636         | 46.5179          |       | Tetrachloro-meta-xylene |   |
| 2    |                  |          |         | 6567        | 731            |                  |       |                         |   |
| 2    |                  |          |         | 850         | 221            |                  |       |                         |   |
| 2    |                  |          |         | 5509        | 1575           |                  |       |                         |   |
| 2    |                  |          |         | 1372        | 255            |                  |       |                         |   |
| 2    |                  |          |         | 571         | 191            |                  |       |                         |   |
| 2    |                  |          |         | 1753        | 483            |                  |       |                         |   |
| 3    |                  |          |         | 3000        | 911            |                  |       |                         |   |
| 3    |                  |          |         | 937         | 231            |                  |       |                         |   |
| 3    |                  |          |         | 722         | 246            |                  |       |                         |   |
| 3    |                  |          | 0 000   | 3041        | 604            | 0 501630         | _     | 75,000                  |   |
| 3    |                  | 7.925    | 0.022   | 2177        | 589<br>239     | 0.581632         | d     | BZ#28                   |   |
| 3    |                  |          |         | 1100<br>669 | 115            |                  |       |                         |   |
| 3    |                  |          |         | 423         | 154            |                  |       |                         |   |
| 3    |                  |          |         | 788         | 239            |                  |       |                         |   |
| 3    |                  |          |         | 1869        | 457            |                  |       |                         |   |
| 4    |                  |          |         | 639         | 130            |                  |       |                         |   |
| 4    |                  |          |         | 637         | 100            |                  |       |                         |   |
| 4    |                  |          |         | 3983        | 687            |                  |       |                         |   |
| 4    |                  |          |         | 2172        | 319            |                  |       |                         |   |
| 4    |                  |          |         | 4623        | 980            |                  |       |                         |   |
| 4    |                  |          |         | 1343        | 284            |                  |       |                         |   |
| 4    |                  |          |         | 422         | 96             |                  |       |                         |   |
| 4    |                  |          |         | 4318        | 907            |                  |       |                         |   |
| 4    |                  |          |         | 706         | 153            |                  |       |                         |   |
| 4    |                  |          | 0.024   | 2540        | 226            | 2.55938          | a     | BZ#77                   |   |
|      | 0 14.025         |          |         | 2829        | 234            | 2.2220           | -•    | <b>-</b>                |   |
| 5    |                  |          |         | 4838        | 854            |                  |       |                         |   |
| 5    |                  |          |         | 1194        | 150            |                  |       |                         |   |
| 5    |                  |          |         | 6132        | 648            |                  |       |                         |   |
| 5    |                  |          |         | 1923        | ء 209ء ہے      |                  |       |                         |   |
|      | 5 18.013         |          |         | 2152        | 445            | 158              |       |                         |   |

|       |         |          |         |        |         | Extract  |       |                     |
|-------|---------|----------|---------|--------|---------|----------|-------|---------------------|
| Peak  | Peak    | Expected | Delta   |        |         | Conc.    |       |                     |
| No.   | RT      | RT       | RT      | Area   | Height  | (ppb)    | Flags | Peak Identification |
| ===== | ======= | =======  | ======= |        | ======= | ======== | ===== |                     |
| 56    | 19.145  |          |         | 211    | 51      |          |       |                     |
| 57    | 19.784  |          |         | 832    | 173     |          |       |                     |
| 58    | 20.442  |          |         | 1079   | 188     |          |       |                     |
| 59    | 20.863  |          |         | 3768   | 317     |          |       | •                   |
| 60    | 21.466  | 8        |         | 1041   | 164     |          |       |                     |
| 61    | 21.949  |          |         | 5054   | 354     |          |       |                     |
| \$ 62 | 22.546  | 22.559   | -0.013  | 352660 | 69875   | 46.9591  |       | BZ#198              |
| 63    | 23.381  |          |         | 2533   | 434     |          |       |                     |
| 64    | 24.645  |          |         | 2303   | 273     |          |       |                     |
| 65    | 25.232  |          |         | 4154   | 417     |          |       |                     |
| 66    | 25.665  |          |         | 2711   | 253     |          |       |                     |
| 67    | 26.451  |          |         | 1221   | 124     |          |       |                     |
| 68    | 26.899  |          |         | 1613   | 202     |          |       |                     |
| 69    | 27.637  |          |         | 2334   | 255     |          | *     |                     |
| 70    | 27.892  |          |         | 1077   | 187     |          |       |                     |
| 71    | 28.063  |          |         | 881    | 159     |          |       |                     |
| 72    | 28.331  |          |         | 3698   | 717     |          |       |                     |
| 73    | 28.495  |          |         | 580    | 115     |          |       |                     |
| 74    | 28.830  |          |         | 889    | 125     |          |       |                     |
| 75    | 29.140  |          |         | 3525   | 294     |          |       |                     |
| 76    | 29.584  |          |         | 3499   | 97      |          |       |                     |
| 77    | 29.703  |          |         | 655    | 126     |          |       |                     |
| 78    | 29.836  |          |         | 7118   | 1013    |          |       |                     |
| 79    | 30.521  |          |         | 15959  | 1802    |          |       |                     |
| 80    | 31.002  |          |         | 2028   | 63      | ***      | e 1   |                     |
| 81    | 31.317  |          |         | 892    | 72      |          |       |                     |
| 82    | 31.490  |          |         | 985    | 153     |          |       |                     |
| 83    | 31.623  |          |         | 429    | 104     |          |       |                     |
| 84    | 31.740  |          |         | 5467   | 622     |          |       |                     |
| 85    | 32.091  |          |         | 1095   | 260     |          |       |                     |
| 86    | 32.226  |          |         | 13138  | 3721    |          |       |                     |
| 87    | 32.494  |          |         | 3361   | 346     |          |       |                     |
| 88    | 32.700  |          |         | 2485   | 494     |          |       |                     |
| 89    | 32.791  |          |         | 8696   | 1328    |          |       |                     |
| 90    | 33.037  |          |         | 2727   | 501     |          |       |                     |
| 91    | 33.146  |          |         | 3989   | 618     |          |       |                     |
| 92    | 33.500  |          |         | 19834  | 2934    |          |       |                     |
| 93    | 34.037  |          |         | 749    | 141     |          |       |                     |
| 94    | 34.121  |          |         | 834    | 213     |          |       |                     |
| 95    | 34.693  |          |         | 13927  | 1465    |          |       |                     |
| 96    | 35.201  |          |         | 2757   | 304     |          |       |                     |
| 97    | 35.491  |          |         | 1045   | 200     |          |       |                     |
| 98    | 35.750  |          |         | 3822   | 789     |          |       |                     |
| 99    | 36.606  |          |         | 510    | 105     |          |       |                     |
| 100   | 39.082  |          |         | 496    | 101     |          |       |                     |
| 101   | 39.224  |          |         | 3370   | 515     |          |       |                     |
|       |         |          |         |        | _       |          |       |                     |

Flags: A - Peak quantitates above calibration range

- a Peak quantitates below reporting limit
- H User selected alternate compound hit
- $\ensuremath{\mathrm{M}}$  Peak manually integrated or manually identified
- R Peak fails recovery
- U User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

| Target | Compounds |
|--------|-----------|
|        |           |

|         |          | (9.5 <u>-</u>           |
|---------|----------|-------------------------|
| Peak    | Expected |                         |
| RT      | RT       | Target Compound         |
| ======= | =======  |                         |
| 4.996   | 5.001    | Tetrachloro-meta-xylene |
|         | 5.761    | BZ#8                    |
|         | 6.701    | BZ#18                   |
| 7.947   | 7.925    | BZ#28                   |
|         | 8.984    | BZ#52                   |
|         | 9.667    | BZ#44                   |
|         | 11.243   | BZ#66                   |
|         | 12.207   | BZ#101 0 1 F 0          |
| 13.777  | 13.752   | BZ#77 UISY              |

STL Burlington - Target GC Injection Report

| Peak    | Expected |                 |
|---------|----------|-----------------|
| RT      | RT       | Target Compound |
| ======= |          |                 |
|         | 14.938   | BZ#118          |
|         | 15.993   | BZ#153          |
|         | 16.155   | BZ#105          |
|         | 17.328   | BZ#138          |
|         | 17.762   | BZ#126          |
|         | 18.647   | BZ#128          |
|         | 20.781   | BZ#180          |
|         | 22.271   | BZ#170          |
| 22.546  | 22.559   | BZ#198          |
|         | 24.552   | BZ#195          |
|         | 27.655   | BZ#206          |
|         | 29.180   | BZ#209          |

| <b>J</b>            | (0.973)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                       |                                | -                                                                                                                 |              |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------|
| N                   | \$1.782)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |                       |                                | 11.8                                                                                                              |              |
|                     | 571,782)<br>72,139)<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843<br>81,843 |      |                       |                                |                                                                                                                   |              |
| <u>س</u> -          | 73,008)<br>(1,008)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |                       |                                |                                                                                                                   |              |
| -4                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                       |                                | -                                                                                                                 |              |
| CR-                 | (1.06)<br>(5.06)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                       |                                | The                                                                                                               | 1 1          |
| 6-                  | 75.0(9)<br>76.7(8)<br>76.7(8)<br>76.6(247)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <br> | <br>Totrochioro-neto- | <del>Hylene (5,30</del> 2)     | маноныя                                                                                                           |              |
| - 33                | R8:8129                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                       |                                | at:<br>na:<br>nst<br>olu<br>olu<br>eth                                                                            | Lab          |
|                     | ₹7,031)<br>►₹7,552)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                       |                                | Matrix Analyst Instrum Column Integra Method Reporte                                                              | SS           |
| -                   | 5(7,552)<br>17,834)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                       |                                | Matrix Analyst Instrument Column Integrator Method Reported                                                       | Sample       |
| 9-                  | (2)<br>(2)<br>(2)<br>(3)<br>(4)<br>(4)<br>(4)<br>(4)<br>(4)<br>(4)<br>(4)<br>(4)<br>(4)<br>(4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                       |                                | or                                                                                                                | )le          |
| 10                  | <b>3</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |                       |                                |                                                                                                                   |              |
| 0                   | (£10,29 <u>£</u> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |                       |                                |                                                                                                                   | ij           |
| <b>P</b> -          | 5(11.383)<br>111.383)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |                       |                                | SC<br>RI<br>RI<br>Fa                                                                                              | 50           |
| 12-                 | F13.395)<br>C12:633                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                       |                                | SOIL  3327_2.i RTX-CLPII Falcon /var/chem/3 17-Oct-2002                                                           | 502120       |
|                     | FBZ#66 (13.007)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                       | }                              | Ct.<br>Ct.<br>Ct.                                                                                                 | 20           |
| 12-                 | (13,389)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |                       |                                | .i<br>PII<br>PII<br>hem                                                                                           |              |
|                     | <del>(11:188)</del>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                       |                                | 02                                                                                                                |              |
| <u>15</u> -         | 2(15,408)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      | ·- *                  |                                | 0.2                                                                                                               |              |
| 16                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                       |                                | 27_2<br>09:5                                                                                                      |              |
| 15                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                       |                                | 7 1.                                                                                                              |              |
| 12.                 | <u>(3</u> 7.962)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                       | ₹                              | 10 D D D D D D D D D D D D D D D D D D D                                                                          |              |
| 18                  | £18.587>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |                       | #O.13                          | Samplinjeo                                                                                                        |              |
| 14 Pe               | 7(19.199)<br>BZ8138 (19.682)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |                       | HultiChrom GC 03oct021608,1231 | Sample Typ<br>Injection<br>Dilution F<br>Data File<br>Compound S<br>100302_1/03                                   | Client       |
| 19 20<br>Time (Hin) | (22.138)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |                       | 030                            | I G TAILE OF A                                                                                                    | <del> </del> |
| ۲ <u>۲</u>          | (21,036)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |                       | ct021                          | le Type ction Dation Faction Faction Faction Faction Faction File cound Sulper 2_1/0300                           | Sa           |
| R-                  | (21,905)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |                       | 608.                           | Pe<br>Date<br>Factor<br>Sublist                                                                                   | Sample       |
| - 1                 | (22,446)<br>(22,759)<br>(23,049)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                       | 231                            | oli<br>To                                                                                                         | le l         |
| 23                  | (23,388)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |                       |                                | ist<br>21                                                                                                         | Ħ H          |
| 2                   | 22.331                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      | •                     |                                | 60                                                                                                                | "            |
| 8-                  | F ====================================                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      | <br>BZ#198 (24,652)   |                                | Type : SAMPLE : O1-OCT-CON Date : 04-OCT-CON Factor : 1.00 Tile : 03oct02 Ind Sublist: ENVNET 1/03OCT021608.b/32C | F01009L      |
| 26                  | (25,840)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |                       |                                | NE CC OC OC OC OC                                                                                                 | 00           |
| <u>N</u> -          | 126: 834)<br>(26. 988)<br>(27. 285)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                       |                                | T-:                                                                                                               | 9L.          |
| :                   | (27,631)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |                       |                                | 2002<br>1608                                                                                                      | S62          |
| 8-                  | (27.983)<br>(28.404)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                       |                                | ωι                                                                                                                | .~           |
| 3                   | (28, 845)<br>(23, 928)<br>(23, 442)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                       | ĺ                              | $\omega$ $\mu$ $\mu$                                                                                              |              |
| 8-                  | £230,8877)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |                       |                                | :26<br>31.<br>7RT                                                                                                 |              |
| <u>ي</u>            | (38:52)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                       |                                | TXC                                                                                                               |              |
| 32-                 | \(\(\)(31.472\)<br>\(\)(31.865\)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                       |                                | .6:26<br>:231.d<br>27RTXCLPII                                                                                     |              |
|                     | ₩26356198°                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |                       |                                | , H · · · · · · · · · · · · · · · · · ·                                                                           |              |
| ಚ-                  | 753,063,878)<br>7533,281)<br>7633,583)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |                       |                                | 'RA                                                                                                               |              |
| <b>3</b> -          | 734-964)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |                       |                                | RAW.m                                                                                                             |              |
| સ <u>-</u>          | (14.855)<br>(14.855)<br>(14.855)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                       |                                | 3                                                                                                                 |              |
| 36                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                       | -                              | ₹.                                                                                                                |              |
| 6.                  | (36,382)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |                       |                                |                                                                                                                   | ·            |

0161

1,2-

1 1 1 6

0.7

0.8

0.9-

37 38

39

**8**-

**#**-

5(37,220) (37,688)

(39,410) (39,849)

Client Sample ID: F01009LS62 Lab Sample ID: 502120

Matrix : SOIL Sample Type : SAMPLE

Injection Date : 04-OCT-2002 16:26 Analyst

Instrument Dilution Factor: 1.00

: 03oct021608-r231.d : RTX-CLPII Data File Column

Compound Sublist: ENVNET Integrator : Falcon

: /var/chem/3327 2.i/100302\_1/030CT021608.b/32CONG\_3327RTXCLPII\_RAW.m Method

Peaks

Reported : 17-Oct-2002 09:57 rrm

|          |                |              | _      |              |                                         | Extract  |       |                         |    |
|----------|----------------|--------------|--------|--------------|-----------------------------------------|----------|-------|-------------------------|----|
| Peak     | Peak           | Expected     | Delta  | _            |                                         | Conc.    |       |                         |    |
| No.      | RT             | RT           | RT     | Area         | Height                                  |          | Flags | Peak Identific          |    |
| 1        | 0.973          |              |        | 163048       | 12133                                   | ======== | ====  |                         |    |
| 2        | 1.259          |              |        | 168260       | 19918                                   |          |       |                         | -2 |
| 3        | 1.782          |              |        | 6806         | 957                                     |          |       |                         |    |
| 4        | 2.139          |              |        | 1717         | 296                                     |          |       |                         |    |
| 5        | 2.441          |              |        | 1517         | 218                                     |          |       |                         |    |
| 6        | 2.549          |              |        | 701          | 152                                     |          |       |                         |    |
| 7        | 2.636          |              |        | 1415         | 302                                     |          |       |                         |    |
| 8        | 2.791          |              |        | 28029        | 4705                                    |          |       |                         |    |
| 9        | 3.008          |              |        | 3886         | 634                                     | )        |       |                         |    |
| 10       | 3.241          |              |        | 29770        | 6995                                    |          |       |                         |    |
| 11       | 3.356          |              |        | 33852        | 9972                                    |          |       |                         |    |
| 12       | 3.425          |              |        | 55887        | 9284                                    |          |       |                         |    |
| 13       | 3.587          |              |        | 23096        | 3525                                    |          |       |                         |    |
| 14       | 3.762          |              |        | 12818        | 3464                                    |          |       |                         |    |
| 15       | 3.837          |              |        | 5112         | 1535                                    |          |       |                         |    |
| 16       | 3.924          |              |        | 8191         | 2381                                    |          |       |                         |    |
| 17       | 4.056          |              |        | 8646         | 3461                                    |          |       |                         |    |
| 18       | 4.107          |              |        | 9850         | 3355                                    |          |       |                         |    |
| 19       | 4.178          |              |        | 5157         | 1737                                    |          |       |                         |    |
| 20       | 4.280          |              |        | 7643         | 1512                                    |          |       |                         |    |
| 21       | 4.493          |              |        | 7426         | 1191                                    |          |       |                         |    |
| 22       | 4.693          |              |        | 4953         | 1720                                    |          |       |                         |    |
| 23       | 4.888          |              |        | 985          | 194                                     |          |       |                         |    |
| 24       | 5.196          | <i>5</i> 201 |        | 345          | 108                                     | 45 4474  |       | Maturahlawa mata walana |    |
| 25       | 5.382          | 5.391        | -0.009 | 503937       | 171442                                  | 45.4474. |       | Tetrachloro-meta-xylene |    |
| 26<br>27 | 5.570          |              |        | 3911         | 943                                     |          |       |                         |    |
| 28       | 5.783<br>6.018 |              |        | 1566<br>4766 | 1254                                    |          |       |                         |    |
| 29       | 6.247          |              |        | 4697         | 1510                                    |          |       |                         |    |
| 30       | 6.510          |              |        | 618          | 202                                     |          |       |                         |    |
| 31       | 6.612          |              |        | 612          | 145                                     |          |       |                         |    |
| 32       | 7.031          |              |        | 2546         | 477                                     |          |       |                         |    |
| 33       | 7.552          |              |        | 3454         | 1021                                    |          |       |                         |    |
| 34       | 7.834          |              |        | 506          | 98                                      |          |       |                         |    |
| 35       | 8.457          |              |        | 442          | 130                                     |          |       |                         |    |
| 36       | 8.523          |              |        | 2685         | 595                                     |          |       |                         |    |
| 37       | 8.680          |              |        | 1005         | 297                                     |          |       |                         |    |
| 38       | 8.829          |              |        | 643          | 169                                     |          |       |                         |    |
| 39       | 9.086          |              |        | 2994         | 540                                     |          |       |                         |    |
| 40       | 9.281          |              |        | 1454         | 266                                     |          |       |                         |    |
| 41       | 9.405          |              |        | 1194         | 211                                     |          |       |                         |    |
| 42       | 9.534          |              |        | 7211         | 1212                                    |          |       |                         |    |
| 43       | 9.760          |              |        | 1206         | 226                                     |          |       |                         |    |
| 44       | 10.206         |              |        | 2850         | 443                                     |          |       |                         |    |
| 45       | 10.292         |              |        | 2260         | 402                                     |          |       |                         |    |
| 46       | 10.928         |              |        | 1603         | 244                                     |          |       |                         |    |
| 47       | 11.023         |              |        | 5092         | 1106                                    |          |       |                         |    |
| 48       | 11.232         |              |        | 1475         | 235                                     |          |       |                         |    |
| 49       | 11.383         |              |        | 9949         | 1612                                    |          |       |                         |    |
| 50       | 12.205         |              |        | 485          | 119                                     |          |       |                         |    |
| 51       | 12.318         |              |        | 1370         | 317                                     |          |       |                         |    |
| 52       | 12.533         |              |        | 525          | 113                                     |          |       |                         |    |
| 53       | 13.007         | 13.056       | -0.049 | 5808         | 1048                                    | 2.31330  | a     | BZ#66                   |    |
| 54       | 13.389         |              |        | 1936         | 189                                     |          |       |                         |    |
| 55       | 14.184         |              |        | 7053         | ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ | 0162     |       |                         |    |

|     | Peak             | Peak             | Europetad      | Dolho        |                |             | Extract  |       |        |        |            |              |
|-----|------------------|------------------|----------------|--------------|----------------|-------------|----------|-------|--------|--------|------------|--------------|
|     | No.              | RT               | Expected<br>RT | Delta        | 2              | **          | Conc.    |       |        |        |            |              |
|     | NO.<br>=====     | R1               | ========<br>K1 | RT<br>====== | Area           | Height      | (ppb)    | Flags |        |        | dentificat |              |
|     | 56               | 14.368           |                |              | 2488           | 310         | =======  | ****  |        | ====== | ========   | _=========== |
|     | 57               | 15.408           |                |              | 8031           | 1057        |          |       |        |        |            |              |
|     | 58               | 17.962           |                |              | 1252           | 190         |          |       |        |        |            |              |
|     | 59               | 18.587           |                |              | 915            | 67          |          |       |        |        |            |              |
|     | 60               | 19.199           |                |              | 9207           | 1015        |          |       |        |        |            |              |
|     | 61               | 19.682           | 19.713         | -0.031       | 3858           | 371         | 0.424244 | a     | BZ#138 |        |            |              |
|     | 62               | 19.990           |                |              | 3816           | 670         |          |       | ,,     |        |            |              |
|     | 63               | 20.185           |                |              | 2624           | 249         |          |       |        |        |            |              |
|     | 64               | 21.036           |                |              | 1622           | 192         |          |       |        |        |            |              |
|     | 65               | 21.905           |                |              | 2588           | 299         |          |       |        |        |            |              |
|     | 66               | 22.446           |                |              | 1087           | 208         |          |       |        |        |            |              |
|     | 67               | 22.759           |                |              | 840            | 139         |          |       |        |        |            |              |
|     | 68               | 23.049           |                |              | 1843           | 365         |          |       |        |        |            |              |
|     | 69               | 23.388           |                |              | 5364           | 319         |          |       |        |        |            |              |
|     | 70               | 23.909           |                |              | 1508           | 266         |          |       |        |        |            |              |
|     | 71               | 24.124           |                |              | 603            | 138         |          |       |        |        |            |              |
|     | 72               | 24.301           | 0.4 650        |              | 3124           | 453         |          |       |        |        |            |              |
|     | \$ 73<br>74      | 24.652<br>25.840 | 24.678         | -0.027       | 566521         | 105575      | 44.3434  |       | BZ#198 |        |            |              |
|     | 7 <b>4</b><br>75 | 26.374           |                |              | 3648           | 242         |          |       |        |        |            |              |
|     | 76               | 26.531           |                |              | 1504<br>2764   | 232         |          |       |        |        |            |              |
|     | 77               | 26.988           |                |              | 4858           | 276<br>323  |          |       |        |        |            |              |
|     | 78               | 27.285           |                |              | 1429           | 202         |          |       |        |        |            |              |
|     | 79               | 27.631           |                |              | 3620           | 305         |          |       |        |        |            |              |
|     | 80               | 27.983           |                |              | 1755           | 149         | T        | ¥ 0   |        |        |            |              |
|     | 81               | 28.404           |                |              | 1296           | 168         |          |       |        |        |            |              |
|     | 82               | 28.845           |                |              | 4644           | 344         |          |       |        |        |            |              |
|     | 83               | 29.078           |                |              | 3238           | 417         |          |       |        |        |            |              |
|     | 84               | 29.258           |                |              | 740            | 152         |          |       |        |        |            |              |
|     | 85               | 29.442           |                |              | 1237           | 219         |          |       |        |        |            |              |
|     | 86               | 29.887           |                |              | 2876           | 426         |          |       |        |        |            |              |
|     | 87               | 30.067           |                |              | 7181           | 968         |          |       |        |        |            |              |
|     | 88               | 30.594           |                |              | 3130           | 325         |          |       |        |        |            |              |
|     | 89               | 30.739           |                |              | 2334           | 386         |          |       |        |        |            |              |
|     | 90               | 30.927           |                |              | 2685           | 378         |          |       |        |        |            |              |
|     | 91               | 31.472           |                |              | 3975           | 227         |          |       |        |        |            |              |
|     | 92               | 31.865           |                |              | 6184           | 1231        |          |       |        |        |            |              |
|     | 93<br>94         | 32.204           |                |              | 1702           | 90          |          |       |        |        |            |              |
|     | 95               | 32.288<br>32.408 |                |              | 504            | 124         |          |       |        |        |            |              |
|     | 96               | 32.878           |                |              | 11518<br>27473 | 2003        |          |       |        |        |            |              |
|     | 97               | 33.008           |                |              | 3518           | 5831<br>734 | •        |       |        |        |            |              |
|     | 98               | 33.281           |                |              | 7277           | 786         |          |       |        |        |            |              |
|     | 99               | 33.583           |                |              | 11215          | 1167        |          |       |        |        |            |              |
|     | 100              | 34.044           |                |              | 8031           | 939         |          |       |        |        |            |              |
|     | 101              | 34.203           |                |              | 3035           | 525         |          | - 2   |        |        |            |              |
|     | 102              | 34.494           |                |              | 3446           | 462         |          |       |        |        |            |              |
|     | 103              | 34.609           |                |              | 11451          | 1763        |          |       |        |        |            |              |
|     | 104              | 34.815           |                |              | 3488           | 346         |          |       |        |        |            |              |
|     | 105              | 35.123           |                |              | 1632           | 262         |          |       |        |        |            |              |
|     | 106              | 35.274           |                |              | 3406           | 363         |          |       |        |        |            |              |
|     | 107              | 35.402           |                |              | 2173           | 382         |          |       |        |        |            |              |
|     | 108              | 35.524           |                |              | 6947           | 1241        |          |       |        |        |            |              |
|     | 109              | 36.382           |                |              | 1549           | 213         |          |       |        |        |            |              |
|     | 110              | 37.220           |                |              | 10910          | 1197        |          |       |        |        |            |              |
|     | 111              | 37.688           |                |              | 1487           | 213         |          |       |        |        |            |              |
|     | 112<br>113       | 39.410<br>39.849 |                |              | 3751           | 320         |          |       |        |        |            |              |
| 123 | 113              | 33.043           |                |              | 3069           | 538         |          |       |        |        |            |              |
|     |                  |                  |                |              |                |             |          |       |        |        |            |              |

Flags: A - Peak quantitates above calibration range

0163

a - Peak quantitates below reporting limit

H - User selected alternate compound hit

M - Peak manually integrated or manually identified R - Peak fails recovery

U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

| Ì  | Peak E | xpected<br>RT | Target    | Compound    |
|----|--------|---------------|-----------|-------------|
| == |        |               | Compounds | *********** |
|    |        | ranger        | Compounds |             |

| Peak   | Expected |                         |
|--------|----------|-------------------------|
| RT     | RT       | Target Compound         |
|        | =======  |                         |
| 5.382  | 5.391    | Tetrachloro-meta-xylene |
|        | 6.592    | BZ#8                    |
|        | 7.698    | BZ#18                   |
|        | 9.137    | BZ#28                   |
|        | 10.341   | BZ#52                   |
|        | 11.312   | BZ#44                   |
| 13.007 | 13.056   | BZ#66                   |
|        | 13.914   | BZ#101                  |
|        | 16.080   | BZ#77                   |
|        | 17.075   | BZ#118                  |
|        | 17.995   | BZ#153                  |
|        | 18.720   | BZ#105                  |
| 19.682 | 19.713   | BZ#138                  |
|        | 20.225   | BZ#126                  |
|        | 21.462   | BZ#128                  |
|        | 23.115   | BZ#180                  |
| 24.652 | 24.678   | BZ#198                  |
|        | 25.004   | BZ#170                  |
|        | 27.203   | BZ#195                  |
|        | 29.805   | BZ#206 **               |
|        | 30.754   | BZ#209                  |

#### FORM 1 OTHER ORGANICS ANALYSIS DATA SHEET

ENVNET SAMPLE NO.

F01009LS63

Lab Name: STL BURLINGTON

Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.:

SDG No.: 89891

Matrix: (soil/water) SOIL

Lab Sample ID: 502119

Sample wt/vol:

30.1 (g/mL) G

Lab File ID: 030CT021608-R221

% Moisture: 24

decanted: (Y/N) N

Date Received: 09/25/02

Extraction: (SepF/Cont/Sonc) SOXH

Date Extracted: 09/26/02

Concentrated Extract Volume: 10 (mL)

Date Analyzed: 10/04/02

Injection Volume: 1.0(uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

pH:

Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/KG

| CAS NO.                                                                                                                                                                                                         | COMPOUND                                                                                    | (ug/L or ug/Kg) UG/KG |                                                                    |               | Q |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-----------------------|--------------------------------------------------------------------|---------------|---|
| 34883-43-7 37680-65-2 7012-37-5 41464-39-5 35693-99-3 32598-10-0 32598-13-3 37680-73-2 32598-14-4 31508-00-6 57465-28-8 38380-07-3 35065-28-2 35065-27-1 35065-30-6 35065-29-3 52663-68-0 52663-78-2 40186-72-9 | BZ#18BZ#28BZ#44BZ#52BZ#66BZ#101BZ#105BZ#118BZ#126BZ#128BZ#138BZ#138BZ#153BZ#170BZ#180BZ#187 |                       | 2.2<br>2.2<br>2.2<br>2.2<br>2.2<br>2.2<br>2.2<br>2.2<br>2.2<br>2.2 | מממממממממממממ |   |
| 2051-24-3                                                                                                                                                                                                       |                                                                                             |                       |                                                                    | Ū             |   |

FORM I OTHER

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Y (x10^5)                                                         |                                                                               |          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------------------|----------|
| \$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.6                                                               |                                                                               |          |
| (0.884)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                   |                                                                               |          |
| ∾ (Z. 093)<br>122. 652)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                   |                                                                               |          |
| (2.915)<br>(3.359)<br>(3.362)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | - T T                                                             | +2                                                                            |          |
| 区(42367)<br>区4.684)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | m un                                                              | ſ                                                                             |          |
| 75,222)<br>- (5,570)<br>- (5,570)<br>- (6,324)<br>- (6,324)<br>- (6,341)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Tetrochioro neba nylene (4,990)                                   | Matrix<br>Analyst<br>Instrument<br>Column<br>Integrator<br>Method<br>Reported | Lab      |
| 05,541)<br>N- 257,027)<br>C7,384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                   | rij<br>ly:<br>tr:<br>tr:<br>umm<br>egj                                        |          |
| 2,756)7,940)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                   | 0 0 3 6 1                                                                     | Sample   |
| 17, 756   7,940   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15,306   15, |                                                                   | lent                                                                          |          |
| (10,323)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 5                                                                 |                                                                               | ID:      |
| 27#66 (11,254)<br>(11,600)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                   | SOIL 3327 RTX-5 Falcoi /var/c 17-Oct                                          | 502      |
| (12.194)<br>(12.424)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | er a <sup>13 a</sup>                                              | SOIL 3327_1.i RTX-5 Falcon /var/chem/3 17-Oct-2002                            | 02119    |
| (13.748)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | o e e                                                             | .i<br>.em                                                                     |          |
| (14:286)<br>行(:836)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 4                                                                 | ري)                                                                           |          |
| (15.727)<br>- 5(16.004)<br>- (16.279)<br>- (16.601)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                   | : 1<br>45                                                                     |          |
| 5(17.308)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 7                                                                 | χ <u>1</u>                                                                    |          |
| 979126 (17,740)<br>748,637)<br>1718,401)<br>1718,624)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | #I/LiGhea                                                         | Sal<br>In<br>Di<br>Da<br>Col<br>/100                                          | Cl       |
| (18.624)<br>(19.143)<br>(19.143)<br>(19.578)<br>(120.435)<br>(120.435)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | FF OR                                                             | Sample Trinjection Injection Dilution Data File Compound 100302_1/            | Client   |
| 113:563                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CC 25                                                             | le Tynction<br>ction<br>tion<br>File<br>File<br>ound :<br>2_1/0               |          |
| 1(20,435)<br>5(20,766)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 000<br>000<br>000<br>000<br>000<br>000<br>000<br>000<br>000<br>00 |                                                                               | Sample   |
| (21,936)<br>5(22,262)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | B2#198 (22,539)                                                   | pe<br>Date<br>Factor<br>Sublis                                                | )le      |
| (23,002)<br>(23,366)<br>(23,676)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                   | pe: Date: Factor: Sublist: 30CT0216                                           | IJ:      |
| E34:3993                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                   | SA<br>04<br>1.<br>03<br>03<br>EN<br>08.]                                      | FO       |
| (25,226)<br>(725,667)<br>(25,937)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                   | SAMPLE<br>04-OCT<br>1.00<br>03oct0<br>ENVNET<br>8.b/32                        | 010      |
| (25,937)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                   | MPLE<br>OCT-<br>00<br>coct02<br>VNET<br>b/320                                 | 160      |
| (26,901)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | (=                                                                | 200<br>2160<br>20NG                                                           | 1009LS63 |
| 727.635)<br>1736:385)<br>1738:381)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | T                                                                 | ω ω ν                                                                         | ω        |
| (29,107)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | m = ∞ 1 m ≡                                                       | 15<br>-r2:<br>332:                                                            |          |
| 29,839>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                   | 15:41<br>r221.d<br>327RTX                                                     |          |
| (30,519)<br>(30,849)<br>(31,138)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                   |                                                                               |          |
| Prog. 6343                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                   |                                                                               |          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                   | RAW.m                                                                         |          |
| (33,139)<br>(5(33,494)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | (res)                                                             | Þ                                                                             |          |
| 7(34,689)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                   |                                                                               |          |
| (35,263)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                   |                                                                               |          |
| (36,165)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                   | '                                                                             |          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | I a gray a                                                        |                                                                               |          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                   |                                                                               |          |
| (38,991)<br>(39,408)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ar u                                                              |                                                                               |          |
| \$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0166                                                              |                                                                               |          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                   |                                                                               |          |

Lab Sample ID: 502119 Client Sample ID: F01009LS63

Matrix : SOIL Sample Type : SAMPLE

Analyst Injection Date : 04-OCT-2002 15:41 bu

Instrument : 3327 1.i Dilution Factor : 1.00

:  $RTX-\overline{5}$ Column Data File : 03oct021608-r221.d

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_1.i/100302\_1/030CT021608.b/32CONG\_3327RTX5\_RAW.m

Peaks

Reported : 17-Oct-2002 09:45 rrm

|    | eak      | Peak             | Expected | Delta         |              |             | Extract<br>Conc. |       |                         |
|----|----------|------------------|----------|---------------|--------------|-------------|------------------|-------|-------------------------|
|    | No.      | RT               | RT       | RT            | Area         | Height      |                  | Flags | Dools Ideas 61 - 41 -   |
|    | ====     | ~=====           | =======  | =======       |              | =======     |                  | ===== | Peak Identification     |
|    | 1        | 0.884            |          |               | 71601        | 7577        |                  |       |                         |
|    | 2        | 1.197            |          |               | 27537        | 2852        |                  |       |                         |
|    | 3        | 1.660            |          |               | 614          | 118         |                  |       |                         |
|    | 4        | 2.093            |          |               | 1564         | 197         |                  |       |                         |
|    | 5        | 2.243            |          |               | 5074         | 877         |                  |       |                         |
|    | 6        | 2.452            |          |               | 1093         | 186         |                  |       |                         |
|    | 7        | 2.915            |          |               | 16007        | 3368        |                  |       |                         |
|    | 8        | 3.256            |          |               | 1330         | 338         |                  |       |                         |
|    | 9        | 3.309            |          |               | 3314         | 628         | • (1)            | - 8   |                         |
|    | 10       | 3.549            |          |               | 1370         | 304         |                  |       |                         |
|    | 11       | 3.762            |          |               | 8266         | 2721        |                  |       |                         |
|    | 12       | 3.897            |          |               | 1916         | 252         |                  |       |                         |
|    | 13       | 4.291            |          |               | 916          | 152         |                  |       |                         |
|    | 14       | 4.387            |          |               | 4117         | 1459        |                  |       |                         |
| _  | 15       | 4.684            | F 001    |               | 1843         | 620         |                  |       |                         |
| \$ | 16<br>17 | 4.990            | 5.001    | <b>=0.011</b> | 326795       | 130361      | 41.3674          |       | Tetrachloro-meta-xylene |
|    | 18       | 5.222            |          |               | 2224         | 382         |                  |       |                         |
|    | 19       | 5.570            |          |               | 4190         | 1375        |                  |       |                         |
|    | 20       | 5.801<br>5.910   |          |               | 244          | 87          |                  |       |                         |
|    | 21       | 6.029            |          |               | 1326<br>464  | 326         |                  |       |                         |
|    | 22       | 6.324            |          |               | 364          | 166<br>88   |                  |       |                         |
|    | 23       | 6.541            |          |               | 958          | 266         |                  |       |                         |
|    | 24       | 7.027            |          |               | 2329         | 557         |                  |       |                         |
|    | 25       | 7.384            |          |               | 201          | 81          |                  |       |                         |
|    | 26       | 7.756            |          |               | 2828         | 578         | •                |       |                         |
|    | 27       | 7.940            | 7.925    | 0.016         | 1224         | 322         | 0.379205         | a     | BZ#28                   |
|    | 28       | 8.073            |          |               | 247          | 77          | 0.3.3203         | ~     | DB#20                   |
|    | 29       | 8.306            |          |               | 971          | 179         |                  |       |                         |
|    | 30       | 8.470            |          |               | 279          | 107         |                  |       |                         |
|    | 31       | 8.590            |          |               | 1704         | 265         |                  |       |                         |
|    | 32       | 8.869            |          |               | 375          | 79          |                  |       |                         |
|    | 33       | 9.243            |          |               | 2772         | 518         |                  |       |                         |
|    | 34       | 9.461            |          |               | 614          | 131         |                  |       |                         |
|    | 35       | 9.634            |          |               | 733          | 149         |                  |       |                         |
|    | 36       | 10.323           |          |               | 2622         | 416         |                  |       |                         |
|    | 37       | 11.254           | 11.243   | 0.011         | 470          | 107         | 0.964451         | a     | BZ#66                   |
|    | 38       | 11.600           |          |               | 557          | 113         |                  |       |                         |
|    | 39       | 12.194           |          |               | 692          | 111         |                  |       |                         |
|    | 40       | 12.424           |          |               | 3047         | 559         |                  |       |                         |
|    | 41       | 13.748           |          |               | 2728         | 254         |                  |       |                         |
|    | 42       | 14.286           |          |               | 1548         | 206         |                  |       |                         |
|    | 43       | 14.490           |          |               | 308          | 81          |                  |       |                         |
|    | 44       | 14.617           |          |               | 1625         | 379         | i.               | 30    |                         |
|    | 45       | 14.836           |          |               | 2308         | 413         |                  |       |                         |
|    | 46       | 15.727           |          |               | 901          | 177         |                  |       |                         |
|    | 47       | 16.004           |          |               | 4509         | 587         |                  |       |                         |
|    | 48       | 16.279           |          |               | 31944        | 3152        |                  |       |                         |
|    | 49       | 16.601           |          |               | 3764<br>4608 | 470         |                  |       |                         |
|    | 50       | 17.308<br>17.740 | 12 262   | 0 000         |              | 625         |                  |       |                         |
|    | 51<br>52 |                  | 17.762   | -0.022        | 390          | 89          | 1.79220 a        |       | BZ#126                  |
|    |          | 18.004           |          |               | 2021         | 434         |                  |       |                         |
|    | 53<br>54 | 18.137<br>18.401 |          |               | 762          | . 185       |                  |       |                         |
|    | 55       | 18.624           |          |               | 1049<br>570  | 210<br>7112 | 167              |       |                         |

STL Burlington - Target GC Injection Report

|          |                  |          |        |               |            | Extract |       |                                         |
|----------|------------------|----------|--------|---------------|------------|---------|-------|-----------------------------------------|
| Peak     | Peak             | Expected | Delta  |               |            | Conc.   |       |                                         |
| No.      | RT               | RT       | RT     | Area          | Height     | (ppb)   | Flags | Peak Identification                     |
| =====    | =======          |          |        |               | =======    |         | ===== | ======================================= |
| 56       | 19.143           |          |        | 547           | 108        |         |       |                                         |
| 57       | 19.305           |          |        | 2222          | 423        |         |       |                                         |
| 58       | 19.571           |          |        | 1916          | 298        |         |       |                                         |
| 59       | 19.786           |          |        | 2230          | 296        |         |       | *                                       |
| 60       | 20.435           |          |        | 2339          | 313        |         |       |                                         |
| 61       | 20.766           |          |        | 8990          | 1074       |         |       |                                         |
| 62       | 21.936           |          |        | 3271          | 329        |         |       |                                         |
| 63       | 22.262           |          |        | 3250          | 488        |         |       |                                         |
| \$ 64    | 22.539           | 22.559   | -0.020 | 322854        | 62058      | 41.5206 |       | BZ#198                                  |
| 65       | 23.002           |          |        | 2828          | 377        |         |       |                                         |
| 66       | 23.366           |          |        | 849           | 157        |         |       |                                         |
| 67       | 23.676           |          |        | 738           | 122        |         |       |                                         |
| 68       | 24.388           |          |        | 575           | 119        |         |       |                                         |
| 69       | 24.532           |          |        | 593           | 118        |         |       |                                         |
| 70       | 25.226           |          |        | 620           | 104        |         |       |                                         |
| 71       | 25.667           |          |        | 1851          | 325        |         |       |                                         |
| 72       | 25.937           |          |        | 900           | 127        |         |       |                                         |
| 73       | 26.901           |          |        | 1086          | 141        |         |       |                                         |
| 74       | 27.635           |          |        | 1845          | 225        |         |       |                                         |
| 75       | 27.906           |          |        | 940           | 142        |         |       |                                         |
| 76       | 28.061           |          |        | 386           | 81         |         |       |                                         |
| 77       | 28.327           |          |        | 2212          | 429        |         |       |                                         |
| 78       | 28.511           |          |        | 398           | 73         |         |       |                                         |
| 79       | 29.107           |          |        | 3684          | 337        |         |       |                                         |
| 80       | 29.839           |          |        | 10521         | 761        | • • •   | 90 22 |                                         |
| 81       | 30.519           |          |        | 10912         | 1078       |         |       |                                         |
| 82       | 30.849           |          |        | 506           | 105        |         |       |                                         |
| 83       | 31.138           |          |        | 681           | 88         |         |       |                                         |
| 84       | 31.621           |          |        | 473           | 101        |         |       |                                         |
| 85       | 31.767           |          |        | 4499          | 445        |         |       |                                         |
| 86       | 31.973           |          |        | 604           | 189        |         |       |                                         |
| 87       | 32.093           |          |        | 829           | 186        |         |       |                                         |
| 88<br>89 | 32.219           |          |        | 2541          | 607        |         |       |                                         |
|          | 32.397           |          |        | 1222          | 192        |         |       |                                         |
| 90<br>91 | 32.556           |          |        | 1549          | 290        |         |       |                                         |
| 91       | 32.667           |          |        | 3216          | 489        |         |       |                                         |
| 93       | 32.782<br>33.139 |          |        | 7213          | 846        |         |       |                                         |
| 94       | 33.139           |          |        | 9338          | 855        |         |       |                                         |
| 95       | 34.037           |          |        | 10192<br>1046 | 1510       |         |       |                                         |
| 96       | 34.119           |          |        |               | 171        |         |       |                                         |
| 97       | 34.119           |          |        | 1108          | 257        | •       |       |                                         |
| 98       | 35.263           |          |        | 4398<br>3415  | 563<br>406 |         |       |                                         |
| 99       | 35.263           |          |        | 3415          | 234        |         |       |                                         |
| 100      | 36.165           |          |        | 1819          | 138        |         |       |                                         |
| 101      | 38.991           |          |        | 1182          | 138        |         |       |                                         |
| 102      | 39.408           |          |        | 850           | 121        |         |       |                                         |
| 102      | 33.400           |          |        | 650           | 126        |         |       |                                         |

Flags: A - Peak quantitates above calibration range

- a Peak quantitates below reporting limit
- H User selected alternate compound hit
- M Peak manually integrated or manually identified
- R Peak fails recovery
- ${\tt U}$  User disabled peak  ${\tt ID}:$  either peak quantitates below reporting limit or peak identification not confirmed on second column

| Peak<br>RT | Expected<br>RT | Target Compound         |
|------------|----------------|-------------------------|
|            | =======        |                         |
| 4.990      | 5.001          | Tetrachloro-meta-xylene |
|            | :5.4761        | BZ#8                    |
|            | 6.701          | BZ#18                   |
| 7.940      | 7.925          | BZ#28                   |
|            | 8.984          | BZ#52                   |
|            | 9.667          | BZ#44                   |
| 11.254     | 11.243         | BZ#66                   |
|            | 12.207         | BZ#101 U L 68           |

STL Burlington - Target GC Injection Report

| Peak    | Expected |                 |
|---------|----------|-----------------|
| RT      | RT       | Target Compound |
| ======= | =======  |                 |
|         | 13.752   | BZ#77           |
|         | 14.938   | BZ#118          |
|         | 15.993   | BZ#153          |
|         | 16.155   | BZ#105          |
|         | 17.328   | BZ#138          |
| 17.740  | 17.762   | BZ#126          |
|         | 18.647   | BZ#128          |
|         | 20.781   | BZ#180          |
|         | 22.271   | BZ#170          |
| 22.539  | 22.559   | BZ#198          |
|         | 24.552   | BZ#195          |
|         | 27.655   | BZ#206          |
|         | 29.180   | BZ#209          |

|   |                | (0.942)<br><b>S</b> (1.244)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                                                                                                                             |
|---|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | - 1            | 1,964)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                                                                                                                                             |
|   | E              | 2,467) 5(2,780)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                                                                                                                                             |
|   | W- 1           | 3.234 ) 45)<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                                                                                                                                             |
|   |                | 2224)45)<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                                                                                                                                             |
|   | 01-            | (5,1%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       | H 241012K                                                                                                                                                   |
|   | 6-             | 75.562)<br>r(s,09)<br>r(s,255)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       | Lab Samp Matrix Analyst Instrume Column Integrat Method Reported                                                                                            |
|   | 34-            | ( <del>199)</del> (7.020)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       | Sa<br>rix<br>Lru<br>umn<br>egr<br>hod                                                                                                                       |
|   | <b>8</b> -     | (2) (44) (7) (44) (7) (44) (7) (44) (7) (44) (7) (44) (7) (44) (7) (44) (7) (44) (7) (7) (7) (7) (7) (7) (7) (7) (7) (7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       | Lab Sample Matrix Analyst Instrument Column Integrator Method Reported                                                                                      |
| ļ | 9-             | <u>13:973)</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                                                                                                                                             |
| İ | 10             | 23:973)<br>[5: 1973]<br>[1] [1] [1] [1] [1] [1] [1] [1] [1] [1]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                                                                                                                                             |
|   | <b>p</b> -     | (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       | 5021<br>SOIL<br>3327<br>RTX-<br>Falc<br>/var<br>17-0                                                                                                        |
| ĺ | ₽-             | 122,307)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       | SOIL  SOIL  3327 2.i RTX-CLPII Falcon /var/chem/3 17-Oct-2002                                                                                               |
|   | 13             | (12.996)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       | 2.3<br>LPI<br>n<br>che                                                                                                                                      |
|   |                | x3.367)<br>x43.910)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                                                                                                                                             |
|   | 15             | ·                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       | ω                                                                                                                                                           |
|   | - 8            | (15,395)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       | 27                                                                                                                                                          |
|   | 16             | 1352926)<br>1828926(16.117)<br>136.441)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       | 57.                                                                                                                                                         |
|   | 17             | ₹(16.864)<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       | 1/10<br>DD<br>DD<br>DD<br>DD                                                                                                                                |
|   | 16-            | □ 1,682)<br>□ 17,962)<br>□ 17,962)<br>□ 17,972)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 3     | Clier<br>Samp.<br>Injec<br>Dilui<br>Data<br>Data<br>Compo<br>.0030.                                                                                         |
|   | 19 20<br>19 20 | \$\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\f{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac}{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\ |       | Client Sample Inject Diluti Data F Compou 100302 rm                                                                                                         |
|   | 20<br>He (Hin) | T27,682)  T217,682)  T217,682)  T217,682)  T21,082)  T21,082)  T21,082)  T21,082)  T21,082)  T21,082)  T21,082)  T21,082)  T21,082)  T21,082)  T21,082)  T21,082)  T21,082)  T21,082)  T21,082)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0.200 |                                                                                                                                                             |
|   | <u>ک</u> ا-    | (21,016)<br>BZ#128 (21,433)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 24606 | Sample Type on Dat n Fact le d Subl                                                                                                                         |
|   | 22             | 元(1.433)<br>(元) (1.433)<br>(元) (1.433)<br>(元) (1.433)<br>(元) (1.433)<br>(元) (1.433)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1221  | pe Date Factor Sublis                                                                                                                                       |
|   | 23-            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       | mple ID pe Date Factor Sublist 30CT021                                                                                                                      |
|   | 24             | 123,902)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       | 60                                                                                                                                                          |
|   | 25             | -BZ#198 (24,643)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       | F01009L SAMPLE 04-OCT- 1.00 03oct02 ENVNET ENVNET                                                                                                           |
|   |                | Tes and                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       | NE CT                                                                                                                                                       |
|   | 26             | 726.367)<br>(26.616)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       | 915<br>915<br>021<br>200                                                                                                                                    |
|   | 27             | (26,986)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       | 2002<br>2002<br>2008<br>2009                                                                                                                                |
|   | 8-             | : \\_8:6(8)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       | 2 1<br>8-r                                                                                                                                                  |
|   | 29-            | (28,808)<br>743,928                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       | 15:<br>r22                                                                                                                                                  |
|   | ų.             | · <del> -</del>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       | 15:41<br>r221.d                                                                                                                                             |
|   | 4              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       | Type : SAMPLE ion Date : 04-OCT-2002 15:41 con Factor : 1.00 con Factor : 03oct021608-r221.d cond Sublist: ENVNET 1/03OCT021608.b/32CONG_3327RTXCLPII_RAW.m |
|   | 32             | Z1.479)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       | [Id                                                                                                                                                         |
|   |                | 122-2383<br>1732-3843<br>1732-3864                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       | ר<br>א                                                                                                                                                      |
|   | ដ              | (733,569)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       | AW                                                                                                                                                          |
|   | ¥.             | - (34,099)<br>- <del>534,556</del>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       | B                                                                                                                                                           |
|   | 8              | <del>- 1                                   </del>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                                                                                                                                             |
|   | 8              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                                                                                                                                             |
|   | 37             | (37,209)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                                                                                                                             |
|   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ı     |                                                                                                                                                             |

0170

9 1

0.6

0.5

38 39

8-

(38,548) (38,998) (39,406) (39,856) 0.7

1.1-

1.2

1,3-

Lab Sample ID: 502119 Client Sample ID: F01009LS63

Matrix : SOIL Sample Type : SAMPLE

Analyst : M Injection Date : 04-OCT-2002 15:41

Instrument : 3327\_2.i Dilution Factor : 1.00

Column : RTX-CLPII Data File : 03oct021608-r221.d

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_2.i/100302\_1/030CT021608.b/32CONG\_3327RTXCLPII\_RAW.m

Peaks

Reported : 17-Oct-2002 09:57 rrm

| D1-         | D1               |                |              |                |            | Extract |          |                         |
|-------------|------------------|----------------|--------------|----------------|------------|---------|----------|-------------------------|
| Peak<br>No. | Peak<br>RT       | Expected<br>RT | Delta        |                |            | Conc.   |          |                         |
| NO.         |                  | K1<br>=======  | RT<br>====== | Area<br>====== | Height     | (ppb)   | Flags    | Peak Identification     |
| 1           | 0.942            |                |              | 88161          | 8064       |         | =====    |                         |
| 2           | 1.244            |                |              | 34858          | 4065       |         |          |                         |
| 3           | 1.964            |                |              | 244            | 47         |         |          |                         |
| 4           | 2.467            |                |              | 500            | 36         |         |          |                         |
| 5           | 2.780            |                |              | 9787           | 1434       |         |          |                         |
| 6           | 3.234            |                |              | 560            | 134        |         |          |                         |
| 7           | 3.345            |                |              | 16581          | 3833       |         |          |                         |
| 8           | 3.482            |                |              | 4144           | 854        |         |          |                         |
| 9           | 3.824            |                |              | 2177           | 351        | •       | * 1      |                         |
| 10          | 4.045            |                |              | 12174          | 3603       |         |          |                         |
| 11          | 4.247            |                |              | 2116           | 334        |         |          |                         |
| 12          | 4.418            |                |              | 1324           | 174        |         |          |                         |
| 13          | 4.582            |                |              | 1504           | 348        |         |          |                         |
| 14          | 4.679            |                |              | 5075           | 1703       |         |          |                         |
| 15          | 5.196            |                |              | 490            | 125        |         |          |                         |
| \$          | 5.371            | 5.391          | -0.020       | 445698         | 153489     | 40.7547 |          | Tetrachloro-meta-xylene |
| 17          | 5.562            |                |              | 4745           | 1006       |         |          | _                       |
| 18<br>19    | 6.009            |                |              | 4622           | 1110       |         |          |                         |
| 20          | 6.238<br>6.490   |                |              | 4392           | 1339       |         |          |                         |
| 21          | 6.599            |                |              | 1061           | 331        |         |          |                         |
| 22          | 7.020            |                |              | 348            | 135        |         |          |                         |
| 23          | 7.020            |                |              | 1635<br>1256   | 288        |         |          |                         |
| 24          | 7.541            |                |              | 1774           | 140<br>506 |         |          |                         |
| 25          | 7.807            |                |              | 343            | 83         |         |          |                         |
| 26          | 8.002            |                |              | 524            | 136        | •       |          |                         |
| 27          | 8.264            |                |              | 1111           | 125        |         |          |                         |
| 28          | 8.512            |                |              | 2431           | 355        |         |          |                         |
| 29          | 9.079            |                |              | 1236           | 256        |         |          |                         |
| 30          | 9.272            |                |              | 707            | 127        |         |          |                         |
| 31          | 9.523            |                |              | 5329           | 1055       |         |          |                         |
| 32          | 9.747            |                |              | 452            | 105        |         |          |                         |
| 33          | 9.924            |                |              | 658            | 173        |         |          |                         |
| 34          | 10.137           |                |              | 556            | 80         |         |          |                         |
| 35          | 10.288           |                |              | 422            | 133        |         |          |                         |
| 36          | 10.365           |                |              | 913            | 231        |         |          |                         |
| 37          | 10.487           |                |              | 1453           | 188        |         |          |                         |
| 38          | 10.913           |                |              | 1138           | 139        |         |          |                         |
| 39          | 11.012           |                |              | 1640           | 375        |         |          |                         |
| 40          | 11.223           |                |              | 472            | 95         |         |          |                         |
| 41          | 11.371           |                |              | 7327           | 1150       |         |          |                         |
| 42          | 12.307           |                |              | 559            | 128        |         |          |                         |
| 43          | 12.996           |                |              | 3428           | 592        |         | 227      |                         |
| 44          | 13.367           |                |              | 2194           | 285        |         |          |                         |
| 45          | 13.910           |                |              | 2256           | 376        |         |          |                         |
| 46<br>47    | 15.395<br>15.916 |                |              | 3000           | 512        |         |          |                         |
| 48          | 16.117           | 16.080         | 0.038        | 746            | 136        | 2 70020 | Tr.      |                         |
| 49          | 16.117           | 10.000         | 0.038        | 968<br>1152    | 184        | 2.70230 | a        | BZ#77                   |
| 50          | 16.864           |                |              | 3157           | 217<br>525 |         |          |                         |
| 51          | 17.682           |                |              | 1126           | 191        |         |          |                         |
| 52          | 17.964           |                |              | 5598           | 795        |         |          |                         |
| 53          | 18.529           |                |              | 4489           | 477        |         |          |                         |
| 54          | 18.718           | 18.720         | -0.002       | 4985           | 577        | 3.05065 | a        | BZ#105                  |
| 55          | 19.183           |                | • • •        | 43843          | ~ 3905∧    | 4 74    | <b>~</b> | DUM 193                 |
|             |                  |                |              |                | 79050      | T / T   |          |                         |

#### STL Burlington - Target GC Injection Report

|    |          |                  |                  |         |                |              | Extract   |       |                     |
|----|----------|------------------|------------------|---------|----------------|--------------|-----------|-------|---------------------|
|    | ak       | Peak             | Expected         | Delta   |                |              | Conc.     | _     |                     |
|    | ю.       | RT               | RT               | RT      | Area           | Height       | (ppb)     | Flags | Peak Identification |
| == |          | =======          |                  | ======= |                |              | ========= | ====  |                     |
|    | 56       | 19.675           | 19.713           | -0.038  | 11762          | 1024         | 0.747875  | a     | BZ#138              |
|    | 57       | 19.979           |                  |         | 4207           | 667          |           |       |                     |
|    | 58       | 20.187           |                  |         | 4608           | 675          |           |       | *                   |
|    | 59       | 20.455           |                  |         | 2654           | 336          |           |       |                     |
|    | 60       | 21.016           | 0: 460           |         | 1040           | 136          |           |       | 75/1400             |
|    | 61       | 21.433           | 21.462           | -0.029  | 641            | 117          | 1.03000   | a     | BZ#128              |
|    | 62       | 21.652           |                  | 177     | 2219           | 488          |           |       |                     |
|    | 63       | 21.892           |                  |         | 448            | 98           |           |       |                     |
|    | 64       | 22.012           |                  |         | 1473           | 231          |           |       |                     |
|    | 65       | 22.273           |                  |         | 360            | 90           |           |       |                     |
|    | 66       | 22.437           |                  |         | 1173           | 217          |           |       |                     |
|    | 67       | 22.754           | 03 115           | 0 035   | 2136           | 250          | 0 026200  | _     | 271100              |
|    | 68<br>69 | 23.080           | 23.115           | -0.035  | 6419           | 1119         | 0.936328  | a     | BZ#180              |
|    | 70       | 23.902           |                  |         | 881            | 166          |           |       |                     |
| \$ | 71       | 24.292<br>24.643 | 24 670           | -0.035  | 4532           | 683          | 40.0695   |       | BZ#198              |
| ÷  | 72       | 24.043           | 24.678<br>25.004 | -0.035  | 514924<br>6738 | 95436<br>997 | 1.18793   |       | BZ#170              |
|    | 73       | 25.199           | 25.004           | -0.035  | 2448           | 247          | 1.10/93   | a     | 82#170              |
|    | 74       | 25.820           |                  |         | 2880           | 265          |           |       |                     |
|    | 75       | 26.367           |                  |         | 714            | 152          |           |       |                     |
|    | 76       | 26.616           |                  |         | 3022           | 297          |           |       |                     |
|    | 77       | 26.986           |                  |         | 901            | 71           |           |       |                     |
|    | 78       | 27.959           |                  |         | 2647           | 252          |           |       |                     |
|    | 79       | 28.274           |                  |         | 1334           | 282          |           |       |                     |
|    | 80       | 28.418           |                  |         | 219            | 46           |           | SE 0  |                     |
|    | 81       | 28.808           |                  |         | 4561           | 416          |           |       |                     |
|    | 82       | 29.076           |                  |         | 2416           | 308          |           |       |                     |
|    | 83       | 29.260           |                  |         | 506            | 88           |           |       |                     |
|    | 84       | 29.440           |                  |         | 1453           | 216          |           |       |                     |
|    | 85       | 29.878           |                  |         | 2839           | 354          |           |       |                     |
|    | 86       | 30.056           |                  |         | 4421           | 624          |           |       |                     |
|    | 87       | 30.650           |                  |         | 2185           | 180          |           |       |                     |
|    | 88       | 30.732           |                  |         | 1505           | 317          |           |       |                     |
|    | 89       | 31.173           |                  |         | 3421           | 89           |           |       |                     |
|    | 90       | 31.479           |                  |         | 504            | 60           |           |       |                     |
|    | 91       | 31.854           |                  |         | 5182           | 919          |           |       |                     |
|    | 92       | 32.290           |                  |         | 5185           | 301          |           |       |                     |
|    | 93       | 32.399           |                  |         | 3651           | 1002         |           |       |                     |
|    | 94       | 32.543           |                  |         | 2602           | 387          |           |       |                     |
|    | 95       | 32.864           |                  |         | 12630          | 1239         |           |       |                     |
|    | 96       | 33.011           |                  |         | 4007           | 742          |           |       |                     |
|    | 97       | 33.261           |                  |         | 9921           | 826          |           |       |                     |
|    | 98       | 33.569           |                  |         | 14038          | 987          |           |       |                     |
|    | 99       | 34.099           |                  |         | 8607           | 528          |           |       |                     |
|    | 100      | 34.467           |                  |         | 2743           | 362          |           |       |                     |
|    | 101      | 34.596           |                  |         | 7631           | 983          |           |       |                     |
|    | 102      | 35.079           |                  |         | 611            | 198          |           |       |                     |
|    | 103      | 35.261           |                  |         | 2357           | 290          |           |       |                     |
|    | 104      | 35.380           |                  |         | 3313           | 554          |           |       |                     |
|    | 105      | 35.509           |                  |         | 4276           | 614          |           |       |                     |
|    | 106      | 37.209           |                  |         | 4308           | 465          |           |       |                     |
|    | 107      | 38.548           |                  |         | 2611           | 133          |           |       |                     |
|    | 108      | 38.998           |                  |         | 1606           | 213          |           |       |                     |
|    | 109      | 39.406           |                  |         | 3308           | 237          |           |       |                     |
|    | 110      | 39.856           |                  |         | 958            | 136          |           |       |                     |

Flags: A - Peak quantitates above calibration range

0172

Reported: 10/17/2002 09:57 rrm 03oct021608-r221.d Page 2

a - Peak quantitates below reporting limit

H - User selected alternate compound hit

M - Peak manually integrated or manually identified

R - Peak fails recovery

U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

#### STL Burlington - Target GC Injection Report

Peak Expected RT RT Target Compound -----====== \_\_ Target Compounds \_ Expected Peak RT RT Target Compound ------======= Tetrachloro-meta-xylene 5.371 5.391 6.592 BZ#8 7.698 BZ#18 9.137 BZ#28 10.341 BZ#52 11.312 BZ#44 13.056 BZ#66 13.914 BZ#101 16.117 16.080 BZ#77 17.075 BZ#118 17.995 BZ#153 18.718 18.720 BZ#105 19.675 19.713 BZ#138 20.225 BZ#126 BZ#128 21.462 21.433 23.080 23.115 BZ#180 24.643 24.678 BZ#198 24.969 25.004 BZ#170 27.203 BZ#195

-- D f

29.805 BZ#206

BZ#209

30.754

3 = 1

a =

la agent in the



**Severn Trent Laboratories, Inc.** 

# PCB CONGENERS STANDARDS

Lab Name: STL BURLINGTON

Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

Instrument ID: 3327\_1 Calibration Date(s): 10/03/02 10/03/02

Column: RTX-5 ID: 0.25 (mm) Calibration Time(s): 1840 2140

LAB FILE ID: RF5: 030CT021607-RRF25: 030CT021607-RF50: 030CT021607-

RF100: 03OCT021607RF200: 03OCT021607

|                                         |              | 1       | 1       | 1       | T -    |
|-----------------------------------------|--------------|---------|---------|---------|--------|
| COMPOUND                                | RF5          | RF25    | RF50    | RF100   | RF200  |
| BZ#8                                    | 4361         |         |         | !       | 1      |
| BZ#18                                   | 5485         |         |         |         |        |
| BZ#28                                   | 6346         |         | 1       |         |        |
| BZ#44                                   | 7169         |         |         |         | •      |
| BZ#49                                   | 6883         |         |         |         |        |
| BZ#52                                   | 6267         | !       |         |         | 1      |
| BZ#66                                   | 4874         | 26790   |         |         |        |
| BZ#77                                   | 1793         |         | 1       |         | •      |
| BZ#81                                   | 9573         | 52532   | !       |         |        |
| BZ#87                                   | 9573         | 1       | 108105  |         | ,      |
| BZ#101                                  | 6418         | 29678   |         |         |        |
| BZ#105                                  | 4932         | 30284   | •       |         |        |
| BZ#114                                  | 5813         | 34637   | 1       |         | ,      |
| BZ#118                                  | 5223         | 27988   | 56824   |         | 1      |
| BZ#123                                  | 5173         | 28877   | 59725   | 115477  |        |
| BZ#126                                  | 2383         | 15457   | 33598   | 66395   |        |
| BZ#128                                  | 7163         | 37607   | 77683   | !       |        |
| BZ#138                                  | 7081         | 35442   | 70198   | 135647  |        |
| BZ#153                                  | 10078        | 47431   | 90887   | 169588  | 318510 |
| BZ#156                                  | 5487         | ,       | 66753   | 135185  | 281219 |
| BZ#157                                  | 5768         | 31568   | 68103   | 134104  | 274322 |
| BZ#167                                  | 5848         | 30119   | 60027   | 115129  | 223579 |
| BZ#169                                  | 4338         | 23175   | 46713   | 90585   | 180982 |
| BZ#170                                  | 7654         | 38708   | 77513   |         | 287305 |
| BZ#180                                  | 7726         | 37039   | 74182   | į       | •      |
| BZ#183                                  | 7632         | 35897   | 70353   | 130881  | 254098 |
| BZ#184                                  | 10078        |         | 90887   | 169588  | 318510 |
| BZ#187                                  | 7520         | 34130   | 64933   | 120830  | 226089 |
| BZ#189                                  | 6905         | 34863   | 70565   | 136042  | 1      |
| BZ#195                                  | 8894         | 41606   | 83155   | 156012  | 299152 |
| BZ#206                                  | 9085         | 40401   | 76390   | 142431  | 271038 |
| BZ#209                                  | 10693        | 45643   | 85234   | 152724  | 280082 |
| ======================================= | <del>-</del> | ======= | ======= | ======= |        |
| Tetrachloro-meta-xylene                 | 14229        | 80682   | 166684  | 321637  | 615745 |
| BZ#198                                  | 8851         | 40100   | 78261   | 149386  | 281488 |
| ·· · · · · · · · · · · · · · · · · · ·  | -            | 10200   | , 5251  | 000     | 201400 |

FORM VI OTHER

Lab Name: STL BURLINGTON

Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

Instrument ID: 3327\_1 Calibration Date(s): 10/03/02 10/03/02

|                                         | COEFFICENTS &RSD |            |            |                   |           |  |  |  |  |
|-----------------------------------------|------------------|------------|------------|-------------------|-----------|--|--|--|--|
| COMPOUND                                | CURVE            | A0         | A1         | OR R <sup>2</sup> | OR R^2    |  |  |  |  |
| ======================================= | =====            | =======    | ========   | =======           | =======   |  |  |  |  |
| BZ#8                                    | WLINR            | -2.0446939 | 682.588365 | 0.9973245         | 0.9900000 |  |  |  |  |
| BZ#18                                   | WLINR            | -3.2341308 | 753.660063 | 0.9947660         | 0.9900000 |  |  |  |  |
| BZ#28                                   | WLINR            | 0.13508004 | 1318.99434 | 0.9997965         | 0.9900000 |  |  |  |  |
| BZ#44                                   | WLINR            | -1.9215920 | 1146.61415 | 0.9971820         | 0.9900000 |  |  |  |  |
| BZ#49                                   | WLINR            | -2.4802125 | 1031.07264 | 0.9961770         | 0.9900000 |  |  |  |  |
| BZ#52                                   | WLINR            | -2.9260951 | 891.175472 | 0.9953648         | 0.9900000 |  |  |  |  |
| BZ#66                                   | WLINR            | 0.87139001 | 1149.78302 | 0.9998809         | 0.9900000 |  |  |  |  |
| BZ#77                                   | WLINR            | 2.19295530 | 616.762264 | 0.9998263         | 0.9900000 |  |  |  |  |
| BZ#81                                   | WLINR            | -0.2188025 | 1016.81525 | 0.9986928         | 0.9900000 |  |  |  |  |
| BZ#87                                   | WLINR            | -0.2188025 | 1016.81525 | 0.9986928         | 0.9900000 |  |  |  |  |
| BZ#101                                  | WLINR            | -2.1369033 | 1009.04434 | 0.9965889         | 0.9900000 |  |  |  |  |
| BZ#105                                  | WLINR            | 1.78495139 | 1387.06101 | 0.9994118         | 0.9900000 |  |  |  |  |
| BZ#114                                  | WLINR            | 1.67832696 | 1585.31415 | 0.9994572         | 0.9900000 |  |  |  |  |
| BZ#118                                  | WLINR            | -0.0257932 | 1093.89717 | 0.9995626         | 0.9900000 |  |  |  |  |
| BZ#123                                  | WLINR            | 0.31286426 | 1155.83711 | 0.9995919         | 0.9900000 |  |  |  |  |
| BZ#126                                  | WLINR            | 1.66247396 | 686.051887 | 0.9997411         | 0.9900000 |  |  |  |  |
| BZ#128                                  | WLINR            | -0.1013709 | 1481.30314 | 0.9992628         | 0.9900000 |  |  |  |  |
| BZ#138                                  | WLINR            | -0.7533738 | 1323.60566 | 0.9989088         | 0.9900000 |  |  |  |  |
| BZ#153                                  | WLINR            | -3.7671586 | 817.237736 | 0.9970902         | 0.9900000 |  |  |  |  |
| BZ#156                                  | WLINR            | 1.39830057 | 1393.06478 | 0.9993636         | 0.9900000 |  |  |  |  |
| BZ#157                                  | WLINR            | 0.94374193 | 1369.27956 | 0.9997405         | 0.9900000 |  |  |  |  |
| BZ#167                                  | WLINR            | -0.5230395 | 1136.13365 | 0.9991348         | 0.9900000 |  |  |  |  |
| BZ#169                                  | WLINR            | 0.05400099 | 910.628616 | 0.9997830         | 0.9900000 |  |  |  |  |
| BZ#170                                  | WLINR            | -0.5957342 | 1464.80220 | 0.9989973         | 0.9900000 |  |  |  |  |
| BZ#180                                  | WLINR            | -0.9025673 | 1388.06289 | 0.9992336         | 0.9900000 |  |  |  |  |
| BZ#183                                  | WLINR            | -1.4269143 | 1288.59843 | 0.9985368         | 0.9900000 |  |  |  |  |
| BZ#184                                  | WLINR            | -3.7671586 | 817.237736 | 0.9970902         | 0.9900000 |  |  |  |  |
| BZ#187                                  | WLINR            | -2.2239081 | 1159.49717 | 0.9969271         | 0.9900000 |  |  |  |  |
| BZ#189                                  | WLINR            | -0.1895187 | 1367.92044 | 0.9998089         | 0.9900000 |  |  |  |  |
| BZ#195                                  | WLINR            | -1.3001894 | 1523.46069 | 0.9985039         | 0.9900000 |  |  |  |  |
| BZ#206                                  | WLINR            | -2.2314201 | 1378.84497 | 0.9978375         | 0.9900000 |  |  |  |  |
| BZ#209                                  | WLINR            | -3.4343436 | 1446.16541 | 0.9940272         | 0.9900000 |  |  |  |  |
| ======================================= | =====            | ========   | 1          | =======           | =======   |  |  |  |  |
| Tetrachloro-meta-xylene                 | WLINR            | 0.11217773 | 3159.86667 | 0.9987133         | 0.9900000 |  |  |  |  |
| BZ#198                                  | WLINR            | -1.6543583 | 1437.35912 | 0.9983137         | !         |  |  |  |  |
|                                         | İ                | j          |            |                   |           |  |  |  |  |

FORM VI OTHER

1 4

Lab Name: STL BURLINGTON Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

Instrument ID: 3327\_2 Calibration Date(s): 10/03/02 10/03/02

Column: RTX-CLPII ID: 0.25 (mm) Calibration Time(s): 1840 2140

LAB FILE ID: RF5: 030CT021607-RRF25: 030CT021607-RF50: 030CT021607-

RF100: 03OCT021607RF200: 03OCT021607

| COMPOUND                                | l<br>RF5    | RF25             | l puro   | DELLOC  |         |
|-----------------------------------------|-------------|------------------|----------|---------|---------|
| COMPOUND                                | !           | KF25<br> ======= | RF50     | RF100   | RF200   |
| BZ#8                                    | 4944        | 23838            | 46481    |         |         |
| BZ#18                                   | <br>6495    | 29235            |          | !       |         |
| BZ#28                                   | 7012        | 39745            | 85333    | 1       | 1       |
| BZ#44                                   | 8320        | 41791            | 83572    | !       |         |
| BZ#49                                   | 8227        | 39204            | 76215    | !       |         |
| BZ#52                                   | <br>7604    | 35213            | 67668    | •       |         |
| BZ#66                                   | 6006        | 36028            | 78980    |         |         |
| BZ#77                                   |             | 19896            | 44585    | ,       |         |
| BZ#81                                   | 10022       | 59978            | 130413   |         | -       |
| BZ#87                                   | 10022       | 59978            | 130413   | •       | 1       |
| BZ#101                                  | 8231        | 40794            | 80265    |         |         |
| BZ#105                                  | 6174        | 40415            | 94992    | 204453  |         |
| BZ#114                                  | 7270        | 47772            | 109103   |         | !       |
| BZ#118                                  | 6784        | 39268            | 83739    |         | •       |
| BZ#123                                  | 6627        | 40501            | 86587    | 174308  |         |
| BZ#126                                  | <br>  10187 | 1                | 100576   | •       |         |
| BZ#128                                  | 9081        | 53427            | 113838   | !       |         |
| BZ#138                                  | 9165        | 50057            | 104398   | 205712  | 394979  |
| BZ#153                                  | 8902        | 45139            | 89534    | 1       | 321342  |
| BZ#156                                  | 7360        | 45457            | . 102613 |         | •       |
| BZ#157                                  | 7779        |                  | 103494   | 214633  | 442528  |
| BZ#167                                  | 7466        | 43165            | 91112    | 178798  | 352446  |
| BZ#169                                  | 6247        | 35861            | 75279    | 151041  | 308920  |
| BZ#170                                  | 9879        | 56258            | 119740   | 236160  | 466793  |
| BZ#180                                  | 10251       | 55007            | 114928   | 228735  | 449485  |
| BZ#183                                  | 10465       | 53003            | 106856   | 205341  | 396614  |
| BZ#184                                  | 10485       | 50157            | 98719    | 186931  | 352924  |
| BZ#187                                  | 10187       | 50351            | 100576   | 189311  | 361934  |
| BZ#189                                  | 9204        | 52430            | 113321   | 229338  | 467690  |
| BZ#195                                  | 11148       | 59628            | 126710   | 248523  | 486905  |
| BZ#206                                  | 15282       | 75265            | 151655   | 286941  | 552215  |
| BZ#209                                  | 17056       | 75639            | 146594   | 273462  | 507641  |
| ======================================= | = =======   | =======          | ======== | ======= | ======= |
| Tetrachloro-meta-xylene                 | _ 15468     | 94788            | 198952   | 387043  | 745379  |
| BZ#198                                  | 11598       | 60886            | 123303   | 241368  | 466213  |
|                                         |             | i                |          |         |         |
|                                         |             |                  |          |         |         |

FORM VI OTHER

Lab Name: STL BURLINGTON

Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

Instrument ID: 3327\_2 Calibration Date(s): 10/03/02 10/03/02

Column: RTX-CLPII ID: 0.25 (mm) Calibration Time(s): 1840 2140

|                                         |       | COEFF      | CENTS      | %RSD      | MAX %RSD  |
|-----------------------------------------|-------|------------|------------|-----------|-----------|
| COMPOUND                                | CURVE | A0         | A1         | OR R^2    | OR R^2    |
| ======================================= | ===== | =======    | =======    | =======   | =======   |
| BZ#8                                    | WLINR | -1.4214587 | 848.852516 | 0.9978783 | 0.9900000 |
| BZ#18                                   | WLINR | -2.6845653 | 959.702830 | 0.9953822 | 0.9900000 |
| BZ#28                                   | WLINR | 1.07124155 | 1731.68491 | 0.9998020 | 0.9900000 |
| BZ#44                                   | WLINR | -0.8930076 | 1544.20283 | 0.9982354 | 0.9900000 |
| BZ#49                                   | WLINR | -1.6842815 | 1370.61447 | 0.9973020 | 0.9900000 |
| BZ#52                                   | WLINR | -2.2228234 | 1190.28176 | 0.9959369 | I         |
| BZ#66                                   | WLINR | 1.67911801 | 1652.52075 | 0.9995409 | 0.9900000 |
| BZ#77                                   | T .   | 2.50881279 | 950.965723 | 0.9994135 | 0.9900000 |
| BZ#81                                   | WLINR | 2.58861745 | 1319.20739 | 0.9997777 | 1         |
| BZ#87                                   | WLINR | 2.58861745 | 1319.20739 | 0.9997777 |           |
| BZ#101                                  | WLINR | -1.2560613 | 1461.68208 | 0.9975828 | 0.9900000 |
| BZ#105                                  | WLINR | 2.77661513 | 2105.53774 | 0.9977224 | 0.9900000 |
| BZ#114                                  | WLINR | 2.56519571 | (          | 0.9983835 | 0.9900000 |
| BZ#118                                  | WLINR | 1.00263266 | 1681.34969 | 0.9998724 | 0.9900000 |
| BZ#123                                  | WLINR | 1.23199932 | 1747.90283 | 0.9998548 | 0.9900000 |
| BZ#126                                  | WLINR | -2.0287778 | 924.968711 | 0.9982880 | 0.9900000 |
| BZ#128                                  | WLINR | 0.97859446 | 2275.99308 | 0.9996336 | 0.9900000 |
| BZ#138                                  | WLINR | 0.24037330 | 2017.72642 | 0.9992523 | 0.9900000 |
| BZ#153                                  | WLINR | -0.9523131 | 1650.44811 | 0.9979354 | 0.9900000 |
| BZ#156                                  | WLINR | 2.37167259 | 2256.09906 | 0.9981078 | 0.9900000 |
| BZ#157                                  | WLINR | 1.89980484 | 2199.92673 | 0.9991218 | 0.9900000 |
| BZ#167                                  | WLINR | 0.70283497 | 1787.54937 | 0.9996965 | 0.9900000 |
| BZ#169                                  | WLINR | 1.09227404 | 1541.49119 | 0.9998596 | 0.9900000 |
| BZ#170                                  | WLINR | 0.76597763 | 2362.84057 | 0.9997629 | 0.9900000 |
| BZ#180                                  | WLINR | 0.44386159 | 2272.23365 | 0.9998146 | 0.9900000 |
| BZ#183                                  | WLINR | -0.5332644 | 2018.15252 |           |           |
| BZ#184                                  | WLINR | -1.3520420 | 1807.87987 | 0.9979966 | 0.9900000 |
| BZ#187                                  | WLINR | -2.0287778 | 924.968711 | 0.9982880 | 0.9900000 |
| BZ#189                                  | WLINR | 1.30453469 | 2334.76824 | 0.9996908 | 0.9900000 |
| BZ#195                                  | WLINR | 0.39995061 | 2468.02484 | 0.9996247 | 0.9900000 |
| BZ#206                                  | WLINR | -0.8529942 | 2814.09465 | 0.9987171 | 0.9900000 |
| BZ#209                                  | WLINR | -2.2265942 | 2608.81101 | 0.9969190 | 0.9900000 |
| ======================================= |       | İ =======  | ========   | =======   | ========  |
| Tetrachloro-meta-xylene                 | WLINR | 0.63386985 | 3825.67075 | 0.9989566 | 0.990000  |
| BZ#198                                  | WLINR | -0.1600296 | 2372.28899 | 0.9993705 | 0.9900000 |
|                                         | i i   |            |            | j         | İ         |

FORM VI OTHER

Lab Name: STL BURLINGTON

Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

Instrument ID: 3327\_1 Calibration Date: 10/03/02 Time: 2310

Lab File ID: 03OCT021607-R1 Init. Calib. Date(s): 10/03/02 10/03/02

Init. Calib. Times: 1840 2140

GC Column: RTX-5 ID: 0.25 (mm)

|                                         | SAMPLE       | CAL50   |         | }     | MAX  |   |
|-----------------------------------------|--------------|---------|---------|-------|------|---|
| COMPOUND                                | AMOUNT       | AMOUNT  | CURVE   | %D    | %d   |   |
|                                         | ========     | ======= | ======= | ===== | ==== | : |
| BZ#8                                    | _ 51         | 50      | WLINR   | 2.0   | 15.0 |   |
| BZ#18                                   | _   51       | 50      | WLINR   | 2.0   | 15.0 |   |
| BZ#28                                   | 48           | 50      | WLINR   | 4.0   | 15.0 |   |
| BZ#44                                   | 51           | 50      | WLINR   | 2.0   | 15.0 | 1 |
| BZ#52                                   | 52           | 50      | WLINR   | 4.0   | 1    |   |
| BZ#66                                   | 46           | 50      | WLINR   | 8.0   | 15.0 |   |
| BZ#77                                   | 39           | 50      | WLINR   | 22.0  | 15.0 |   |
| BZ#101                                  | 52           | 50      | WLINR   | 4.0   |      |   |
| BZ#105                                  | _ 44         | 50      | WLINR   | 12.0  | 15.0 |   |
| BZ#118                                  | 43           | 50      | WLINR   | 14.0  | 15.0 | 4 |
| BZ#126                                  | 44           | 50      | WLINR   | 12.0  | 15.0 |   |
| BZ#128                                  | 50           | 50      | WLINR   | 0.0   | 15.0 |   |
| BZ#138                                  | 48           | 50      | WLINR   | 4.0   | 15.0 |   |
| BZ#153                                  | 65           | 50      | WLINR   | 30.0  | 15.0 |   |
| BZ#170                                  | _  50        | 50      | WLINR   | 0.0   | 15.0 |   |
| BZ#180                                  | 47           | 50      | WLINR   | 6.0   | 15.0 |   |
| BZ#187                                  | _ <br>50     | 50      | WLINR   | 0.0   |      |   |
| BZ#195                                  | 50           | 50      | WLINR   | 0.0   |      |   |
| BZ#206                                  | 52           | . 50    | WLINR   | 4.0   |      |   |
| BZ#209                                  | _<br>52      | 50      | WLINR   | 4.0   | 15.0 |   |
| ======================================= | = =======    | ======= | ======= | ===== | ==== |   |
| Tetrachloro-meta-xylene                 | 49           | 50      | WLINR   | 2.0   | 15.0 |   |
| BZ#198                                  | _<br>_<br>51 | 50      | WLINR   | 2.0   | 15.0 |   |
|                                         | _            |         |         |       |      |   |

Lab Name: STL BURLINGTON

Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

Instrument ID: 3327\_1 Calibration Date: 10/04/02 Time: 0855

Lab File ID: 03OCT021608-R1 Init. Calib. Date(s): 10/03/02 10/03/02

Init. Calib. Times: 1840 2140

GC Column: RTX-5 ID: 0.25 (mm)

| COMPOUND                                | SAMPLE<br>AMOUNT                           | CAL50<br>AMOUNT | CURVE | %D     | MAX<br>%d |
|-----------------------------------------|--------------------------------------------|-----------------|-------|--------|-----------|
| COMPOUND                                | =                                          |                 |       | =====[ | ====      |
| 3Z#8                                    | 54                                         | 50              | WLINR | 8.0    | 15.0      |
| 3Z#18                                   | 54                                         | 50              | WLINR |        | 15.0      |
| 3Z#10                                   | 51                                         | 50              | WLINR | 2.0    | 15.0      |
| 3Z#44                                   | -\ 54\                                     | 50              | WLINR | 8.0    |           |
| BZ#49                                   | -l 54 l                                    | 50              | WLINR | 8.0    |           |
| BZ#52                                   | -\ 54\                                     | 50              | WLINR | 8.0    |           |
|                                         | -\ 50\                                     | 50              | WLINR | 0.0    | 15.0      |
| BZ#66                                   | 50                                         | 50              | WLINR | 0.0    |           |
| BZ#77                                   | - 110                                      | 100             | WLINR |        | 15.0      |
| BZ#81                                   | - 110                                      | 100             | WLINR | 10.0   | 15.0      |
| BZ#87                                   | - 55                                       | 50              | WLINR | 10.0   |           |
| BZ#101                                  | - 50                                       | 50              | WLINR | 0.0    |           |
| BZ#105                                  | - 49                                       | 50              | WLINR | 2.0    |           |
| BZ#114                                  | - 53                                       | 50              | WLINR | 6.0    | 15.0      |
| BZ#118                                  | - 52 S                                     | 50              | WLINR | 4.0    | 15.0      |
| BZ#123                                  | $-\begin{vmatrix} & 52\\ 51 \end{vmatrix}$ | 50              | WLINR | 2.0    | 15.0      |
| BZ#126                                  | $-\begin{vmatrix} 51\\54 \end{vmatrix}$    | 50              | WLINR | 8.0    | 15.0      |
| BZ#128                                  | _\ 54\                                     | 50              | WLINR | 8.0    |           |
| BZ#138                                  | -  110                                     | . 100           | WLINR | 10.0   |           |
| BZ#153                                  | $ \begin{bmatrix} 110 \\ 51 \end{bmatrix}$ | 50              | WLINR | 2.0    |           |
| BZ#156                                  | -\ 51                                      | 50              | WLINR | 2.0    |           |
| BZ#157                                  | $-\begin{vmatrix} 51\\54 \end{vmatrix}$    | 50              | WLINR | 8.0    |           |
| BZ#167                                  |                                            | 50              | WLINR | 6 0    | 15.0      |
| BZ#169                                  | 53                                         | 50              | WLINR |        | 15.0      |
| BZ#170                                  | 54                                         | 50              | WLINR |        | 15.0      |
| BZ#180                                  | 54                                         | 50              | WLINR | 8.0    |           |
| BZ#183                                  | 54                                         | 100             | WLINR | 10.0   |           |
| BZ#184                                  | 110                                        | 50              | WLINR | 10.0   |           |
| BZ#187                                  | 55                                         | 50              | 1     | 6.0    |           |
| BZ#189                                  | 53                                         |                 | 1     | 10.0   |           |
| BZ#195                                  | 55                                         | 50              |       | 12.0   | )         |
| BZ#206                                  | 56                                         | 50              |       | 16.0   | 4         |
| BZ#209                                  | 58                                         | 50              |       | l .    | 1         |
| ======================================= |                                            | 50              | 1     | 4.0    | 1         |
| Tetrachloro-meta-xylene                 | — 55<br>55                                 | L .             | l l   | 10.0   | 15.0      |
| BZ#198                                  |                                            | )               |       |        | 1         |

Lab Name: STL BURLINGTON Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

Instrument ID: 3327\_1 Calibration Date: 10/04/02 Time: 1841

Lab File ID: 03OCT021608-R2 Init. Calib. Date(s): 10/03/02 10/03/02

Init. Calib. Times: 1840 2140

GC Column: RTX-5 ID: 0.25 (mm)

|                                         | SAMPLE   | CAL50    | Т       |       | MAX  |
|-----------------------------------------|----------|----------|---------|-------|------|
| COMPOUND                                | AMOUNT   | AMOUNT   | CURVE   | %D    | %d   |
|                                         | ======== | ======== | ======= | ===== | ==== |
| BZ#8                                    | 52       | 50       | WLINR   | 4.0   | 15.0 |
| BZ#18                                   | 53       | 50       |         | 6.0   |      |
| BZ#28                                   | 49       | 50       |         | 2.0   |      |
| BZ#44                                   | 52       | 50       |         | 4.0   |      |
| BZ#49                                   | 53       | 50       |         | 6.0   |      |
| BZ#52                                   | 53       | 50       |         | 6.0   | 15.0 |
| BZ#66                                   | 48       | 50       | WLINR   | 4.0   | 15.0 |
| BZ#77                                   | 48       | 50       |         | 4.0   | 15.0 |
| BZ#81                                   | 100      | 100      | WLINR   | 0.0   | 15.0 |
| BZ#87                                   | 100      | 100      | WLINR   | 0.0   | 15.0 |
| BZ#101                                  | 53       | 50       | WLINR   | 6.0   | 15.0 |
| BZ#105                                  | 48       | 50       | WLINR   | 4.0   | 15.0 |
| BZ#114                                  | 48       | 50       | WLINR   | 4.0   | 15.0 |
| BZ#118                                  | 51       | 50       | WLINR   | 2.0   | 15.0 |
| BZ#123                                  | 50       | 50       | WLINR   | 0.0   | 15.0 |
| BZ#126                                  | 48       | 50       | WLINR   | 4.0   | 15.0 |
| BZ#128                                  | 52       | 50       | WLINR   | 4.0   | 15.0 |
| BZ#138                                  | 52       | 50       | WLINR   | 4.0   | 15.0 |
| BZ#153                                  | 100      | . 100    | WLINR   | 0.0   | 15.0 |
| BZ#156                                  | 48       | 50       | WLINR   | 4.0   | 15.0 |
| BZ#157                                  | 50       | 50       | WLINR   | 0.0   | 15.0 |
| BZ#167                                  | 52       | 50       | WLINR   | 4.0   | 15.0 |
| BZ#169                                  | 50       | 50       | WLINR   | 0.0   | 15.0 |
| BZ#170                                  | 52       | 50       | WLINR   | 4.0   | 15.0 |
| BZ#180                                  | 52       | 50       | WLINR   | 4.0   | 15.0 |
| BZ#183                                  | 52       | 50       | WLINR   | 4.0   | 15.0 |
| BZ#184                                  | 100      | 100      | WLINR   | 0.0   | 15.0 |
| BZ#187                                  | 54       | 50       | WLINR   | 8.0   | 15.0 |
| BZ#189                                  | 51       | 50       | WLINR   | 2.0   | 15.0 |
| BZ#195                                  | 53       | 50       | WLINR   | 6.0   | 15.0 |
| BZ#206                                  | 53       | 50       | WLINR   |       | 15.0 |
| BZ#209                                  | 55       | 50       | WLINR   | 10.0  | 15.0 |
| ======================================= | =======  | ======== | ======= | ===== | ==== |
| Tetrachloro-meta-xylene                 | 51       | 50       | WLINR   | 2.0   | 15.0 |
| BZ#198                                  | 53       | 50       | WLINR   | 6.0   | 15.0 |
|                                         |          |          |         |       |      |

Lab Name: STL BURLINGTON

Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

Instrument ID: 3327\_2 Calibration Date: 10/03/02 Time: 2310

Lab File ID: 03OCT021607-R1 Init. Calib. Date(s): 10/03/02 10/03/02

Init. Calib. Times: 1840 2140

GC Column: RTX-CLPII ID: 0.25 (mm)

|                                         | SAMPLE     | CAL50   |         |       | MAX  | 1  |
|-----------------------------------------|------------|---------|---------|-------|------|----|
| COMPOUND                                | AMOUNT     | AMOUNT  | CURVE   | %D    | %d   |    |
| ======================================= | = ======== | ======= | ======= | ===== | ==== |    |
| BZ#8                                    | _   50     | 50      | WLINR   | 0.0   | 15.0 |    |
| BZ#18                                   | _ 51       | 50      | WLINR   | 2.0   | 15.0 |    |
| BZ#28                                   | 48         | 50      | WLINR   | 4.0   | 15.0 | 1  |
| BZ#44                                   | _ 50       | 50      | WLINR   | 0.0   | 15.0 |    |
| BZ#52                                   | 52         | 50      | WLINR   | 4.0   | 15.0 |    |
| BZ#66                                   | 46         | 50      | WLINR   | 8.0   | 15.0 |    |
| BZ#77                                   | 40         | 50      | WLINR   |       | 15.0 | <- |
| BZ#101                                  | 51         | 50      | WLINR   | 2.0   | 15.0 |    |
| BZ#105                                  | 43         | 50      | WLINR   | 14.0  | 15.0 | -  |
| BZ#118                                  | 42         | 50      | WLINR   | 16.0  | 15.0 | <- |
| BZ#126                                  | 96         | 100     | WLINR   |       | 15.0 |    |
| BZ#128                                  | 49         | 50      | WLINR   | 2.0   | 15.0 |    |
| BZ#138                                  | 48         | 50      | WLINR   | 4.0   | 15.0 |    |
| BZ#153                                  | 50         | 50      | WLINR   | 0.0   | 15.0 |    |
| BZ#170                                  | 49         | 50      | WLINR   |       | 15.0 |    |
| BZ#180                                  | 46         | 50      | WLINR   | 8.0   | 15.0 |    |
| BZ#187                                  | 96         | 100     | WLINR   | 4.0   | 15.0 |    |
| BZ#195                                  | 47         | 50      | WLINR   | 6.0   | 15.0 |    |
| BZ#206                                  | _ 51       | . 50    | WLINR   |       | 15.0 |    |
| BZ#209                                  | 51         | 50      | WLINR   | 2.0   | 15.0 |    |
| ======================================= | = =======  | ======= | ======= | ===== | ==== |    |
| Tetrachloro-meta-xylene                 | _ 48       | 50      | WLINR   | 4.0   |      |    |
| BZ#198                                  | 50         | 50      | WLINR   | 0.0   | 15.0 | 1  |
|                                         | _          |         |         |       |      |    |

Lab Name: STL BURLINGTON Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

Instrument ID: 3327\_2 Calibration Date: 10/04/02 Time: 0855

Lab File ID: 03OCT021608-R1 Init. Calib. Date(s): 10/03/02 10/03/02

Init. Calib. Times: 1840 2140

GC Column: RTX-CLPII ID: 0.25 (mm)

|                                         | SAMPLE  | CAL50    | <u> </u> | }      | MAX  |
|-----------------------------------------|---------|----------|----------|--------|------|
| COMPOUND                                | AMOUNT  | AMOUNT   | CURVE    | %D     | %d   |
|                                         | ======= | ======== | =======  | 1      | ==== |
| BZ#8                                    | 53      | 50       | WLINR    | 6.0    |      |
| BZ#18                                   | 54      | 50       | 1        | 8.0    |      |
| BZ#28                                   | 50      | 50       | WLINR    | 0.0    |      |
| BZ#44                                   | 52      | 50       | WLINR    | 4.0    |      |
| BZ#49                                   | 53      | 50       | WLINR    | 6.0    |      |
| BZ#52                                   | 54      | 50       | WLINR    | 8.0    |      |
| BZ#66                                   | 49      | 50       | WLINR    | 2.0    |      |
| BZ#77                                   | 49      | 50       | WLINR    | 2.0    | 15.0 |
| BZ#81                                   | 100     | 100      | WLINR    | 0.0    | 15.0 |
| BZ#87                                   | 100     | 100      | WLINR    | 0.0    | 15.0 |
| BZ#101                                  | 53      | 50       | WLINR    | 6.0    | 15.0 |
| BZ#105                                  | 48      | 50       | WLINR    | 4.0    | 15.0 |
| BZ#114                                  | 48      | 50       | WLINR    | 4.0    | 15.0 |
| BZ#118                                  | 51      | 50       | WLINR    | 2.0    | 15.0 |
| BZ#123                                  | 51      | 50       | WLINR    | 2.0    | 15.0 |
| BZ#126                                  | 100     | 100      | WLINR    | 0.0    |      |
| BZ#128                                  | 52      | 50       | WLINR    | 4.0    | 15.0 |
| BZ#138                                  | 52      | 50       | WLINR    | 4.0    | 15.0 |
| BZ#153                                  | 53      | . 50     | WLINR    | 6.0    | 15.0 |
| BZ#156                                  | 48      | 50       | WLINR    | 4.0    | 15.0 |
| BZ#157                                  | 50      | 50       | WLINR    | 0.0    | 15.0 |
| BZ#167                                  | 53      | 50       | WLINR    | 6.0    | 15.0 |
| BZ#169                                  | 52      | 50       | WLINR    | 4.0    | 15.0 |
| BZ#170                                  | 51      | 50       | WLINR    | 2.0    | 15.0 |
| BZ#180                                  | 51      | 50       | WLINR    | 2.0    | 15.0 |
| BZ#183                                  | 53      | 50       | WLINR    | 6.0    | 15.0 |
| BZ#184                                  | 53      | 50       | WLINR    | 6.0    | 15.0 |
| BZ#187                                  | 100     | 100      | WLINR    | 0.0    | 15.0 |
| BZ#189                                  | 51      | 50       | WLINR    | 2.0    | 15.0 |
| BZ#195                                  | 52      | 50       | WLINR    | 4.0    | 15.0 |
| BZ#206                                  | 55      | 50       | WLINR    |        | 15.0 |
| BZ#209                                  | 56      | 50       | WLINR    |        | 15.0 |
| ======================================= | ======= | ======== | =======  | ====== | ==== |
| Tetrachloro-meta-xylene                 | 52      | n- 50    | WLINR    | 4.0    | 15.0 |
| BZ#198                                  | 53      | 50       | WLINR    |        | 15.0 |
|                                         |         |          |          | 0.0    |      |
| <del></del>                             |         |          |          | I      |      |

Lab Name: STL BURLINGTON Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

Instrument ID: 3327\_2 Calibration Date: 10/04/02 Time: 1841

Lab File ID: 03OCT021608-R2 Init. Calib. Date(s): 10/03/02 10/03/02

Init. Calib. Times: 1840 2140

GC Column: RTX-CLPII ID: 0.25 (mm)

| GOMBONE                                 | SAMPLE  | CAL50   | GUDUE   | 9.75        | XAM<br>%d |
|-----------------------------------------|---------|---------|---------|-------------|-----------|
| COMPOUND                                | AMOUNT  | AMOUNT  | CURVE   | %D<br>===== | &CI       |
| BZ#8                                    | 52      | 50      | WLINR   | 4.0         | 15.0      |
| BZ#18                                   | 53      | 50      | WLINR   | 6.0         | 15.0      |
| BZ#28                                   | 48      | 50      | WLINR   | 4.0         | 15.0      |
| BZ#44                                   | 51      | 50      | WLINR   | 2.0         | 15.0      |
| BZ#49                                   | 52      | 50      | WLINR   | 4.0         | 15.0      |
| BZ#52                                   | 52      | 50      | WLINR   | 4.0         | 15.0      |
| BZ#66                                   | 48      | 50      | WLINR   | 4.0         | 15.0      |
| BZ#77                                   | 47      | 50      | WLINR   | 6.0         | 15.0      |
| BZ#81                                   | 97      | 100     | WLINR   | 3.0         | 15.0      |
| BZ#87                                   | 97      | 100     | WLINR   | 3.0         | 15.0      |
| BZ#101                                  | 52      | 50      | WLINR   | 4.0         | 15.0      |
| BZ#105                                  | 46      | 50      | WLINR   | 8.0         | 15.0      |
| BZ#114                                  | 47      | 50      | WLINR   | 6.0         | 15.0      |
| BZ#118                                  | 50      | 50      | WLINR   | 0.0         | 15.0      |
| BZ#123                                  | 50      | 50      | WLINR   | 0.0         | 15.0      |
| BZ#126                                  | 100     | 100     | WLINR   | 0.0         | 15.0      |
| BZ#128                                  | 51      | 50      | WLINR   | 2.0         | 15.0      |
| BZ#138                                  | 51      | 50      | WLINR   | 2.0         | 15.0      |
| BZ#153                                  | 52      | . 50    | WLINR   | 4.0         | 15.0      |
| BZ#156                                  | 47      | 50      | WLINR   | 6.0         | 15.0      |
| BZ#157                                  | 48      | 50      | WLINR   | 4.0         | 15.0      |
| BZ#167                                  | 51      | 50      | WLINR   | 2.0         | 15.0      |
| BZ#169                                  | 50      | 50      | WLINR   | 0.0         | 15.0      |
| BZ#170                                  | 51      | 50      | WLINR   | 2.0         | 15.0      |
| BZ#180                                  | 50      | 50      | WLINR   | 0.0         | 15.0      |
| BZ#183                                  | 51      | 50      | WLINR   | 2.0         | 15.0      |
| BZ#184                                  | 52      | 50      | WLINR   | 4.0         | 15.0      |
| BZ#187                                  | 100     | 100     | WLINR   | 0.0         | 15.0      |
| BZ#189                                  | 50      | 50      | WLINR   | 0.0         | 15.0      |
| BZ#195                                  | 51      | 50      | WLINR   | 2.0         | 15.0      |
| BZ#206                                  | 53      | 50      | WLINR   | 6.0         | 15.0      |
| BZ#209                                  | 54      | 50      | WLINR   | 8.0         | 15.0      |
| ======================================= | ======= | ======= | ======= | =====       | ====      |
| Tetrachloro-meta-xylene                 | 50      | 50      | WLINR   | 0.0         | 15.0      |
| BZ#198                                  | 51      | 50      | WLINR   | 2.0         | 15.0      |
| <u> </u>                                |         |         |         | l           |           |

# FORM 8 OTHER ANALYTICAL SEQUENCE

Lab Name: STL BURLINGTON Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

GC Column: RTX-5 ID: 0.25 (mm) Init. Calib. Date(s): 10/03/02 10/03/02

Instrument ID: 3327 1

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

|      | MEAN SURRO |           |           |          |         |          |
|------|------------|-----------|-----------|----------|---------|----------|
|      | CLIENT     | LAB       | DATE      | TIME     | S1      | S2       |
|      | SAMPLE NO. | SAMPLE ID | ANALYZED  | ANALYZED | RT #    | RT #     |
|      | =========  | ========= | =======   | =======  | ======= | ======== |
| 01   | 32CONG-L1  | 32CONG-L1 | 10/03/02  | 1840     | 5.00    | 22.56    |
| 02   | 32CONG-L2  | 32CONG-L2 | 10/03/02  | 1925     | 4.99    | 22.55    |
| 03   | 32CONG-L3  | 32CONG-L3 | 10/03/02  | 2010     | 5.00    | 22.56    |
| 04   | 32CONG-L4  | 32CONG-L4 | 10/03/02  | 2055     | 5.00    | 22.56    |
| 05   | 32CONG-L5  | 32CONG-L5 | 10/03/02  | 2140     | 4.99    | 22.55    |
| 06   | 20ICV-50   | 20ICV-50  | 10/03/02  | 2310     | 4.99    | 22.55    |
| 07   | PBLKO8     | PBLKO8    | 10/03/02  | 2355     | 5.00    | 22.56    |
| 80   | 08LCS      | O8LCS     | 10/04/02  | 0040     | 5.00    | 22.55    |
| 09   | O8LCSD     | O8LCSD    | 10/04/02  | 0125     | 4.99    | 22.54    |
| 10   | F01009LS13 | 502104    | 10/04/02  | 0210     | 5.00    | 22.56    |
| 11   | F01009LS12 | 502105    | 10/04/02  | 0255     | 5.00    | 22.55    |
| ` 12 | F01009LS11 | 502106    | 10/04/02  | 0340     | 4.99    | 22.54    |
| 13   | F01009LS23 | 502107    | 10/04/02  | 0425     | 5.00    | 22.55    |
| 14   | F01009LS22 | 502108    | 10/04/02  | 0510     | 4.99    | 22.55    |
| ° 15 | F01009LS21 | 502109    | 10/04/02  | 0555     | 5.00    | 22.55    |
| 16   | F01009LS33 | 502110    | 10/04/02  | 0640     | 4.99    | 22.55    |
| 17   | F01009LS32 | 502111    | 10/04/02. | 0725     | 5.00    | 22.55    |
| 18   | 32CONG-L3  | 32CONG-L3 | 10/04/02  | 0855     | 4.99    | 22.53    |
| 19   | PIBLK_SCU  | PIBLK_SCU | 10/04/02  | 0940     | 5.00    | 22.55    |
| 20   | F01009LS31 | 502112    | 10/04/02  | 1025     | 5.00    | 22.55    |
| 21   | F01009LS43 | 502113    | 10/04/02  | 1110     | 5.00    | 22.55    |
| 22   | F01009LS42 | 502114    | 10/04/02  | 1155     | 5.00    | 22.55    |
| 23   | F01009LS41 | 502115    | 10/04/02  | 1241     | 5.00    | 22.55    |
| 24   | F01009LS53 | 502116    | 10/04/02  | 1326     | 4.99    | 22.54    |
| 25   | F01009LS52 | 502117    | 10/04/02  | 1411     | 5.00    | 22.55    |
| 26   | F01009LS51 | 502118    | 10/04/02  | 1456     | 5.00    | 22.55    |
| 27   | F01009LS63 | 502119    | 10/04/02  | 1541     | 4.99    | 22.54    |
| 28   | F01009LS62 | 502120    | 10/04/02  | 1626     | 5.00    | 22.55    |
| 29   | F01009LS61 | 502121    | 10/04/02  | 1711     | 5.00    | 22.55    |
| 30   | 32CONG-L3  | 32CONG-L3 | 10/04/02  | 1841     | 4.99    | 22.53    |
| 31   |            |           |           |          |         |          |
| 32   |            |           |           | . 10     |         |          |

QC LIMITS

S1 = Tetrachloro-meta-xylen (+/-0.05 MINUTES)

SZ = BZ#198

<sup>(+/-0.05</sup> MINUTES)

<sup>#</sup> Column used to flag retention time values with an asterisk.

<sup>\*</sup> Values outside of QC limits.

## FORM 8 OTHER ANALYTICAL SEQUENCE

Lab Name: STL BURLINGTON Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

GC Column: RTX-CLPII ID: 0.25 (mm) Init. Calib. Date(s): 10/03/02 10/03/02

Instrument ID: 3327\_2

THE ANALYTICAL SEQUENCE OF PERFORMANCE EVALUATION MIXTURES, BLANKS, SAMPLES, AND STANDARDS IS GIVEN BELOW:

|    | MEAN SURRO           |                      |                  |                  |            |            |  |  |  |
|----|----------------------|----------------------|------------------|------------------|------------|------------|--|--|--|
|    | S1 : 5.39            | S1 : 5.39 S2 : 24.68 |                  |                  |            |            |  |  |  |
|    | OT TENM              | 170                  | DAME             | mTMT.            |            |            |  |  |  |
|    | CLIENT<br>SAMPLE NO. | LAB<br>SAMPLE ID     | DATE<br>ANALYZED | TIME<br>ANALYZED | S1<br>RT # | S2<br>RT # |  |  |  |
|    | SAMPLE NO.           | SAMPLE ID            | ANALIZED         | ANALIZED         |            | H          |  |  |  |
| 01 | 32CONG-L1            | 32CONG-L1            | 10/03/02         | 1840             | 5.39       | 24.68      |  |  |  |
| 02 | 32CONG-L2            | 32CONG-L2            | 10/03/02         | 1925             | 5.39       | 24.67      |  |  |  |
| 03 | 32CONG-L3            | 32CONG-L3            | 10/03/02         | 2010             | 5.39       | 24.68      |  |  |  |
| 04 | 32CONG-L4            | 32CONG-L4            | 10/03/02         | 2055             | 5.39       | 24.67      |  |  |  |
| 05 | 32CONG-L5            | 32CONG-L5            | 10/03/02         | 2140             | 5.38       | 24.67      |  |  |  |
| 06 | 20ICV-50             | 20ICV-50             | 10/03/02         | 2310             | 5.39       | 24.67      |  |  |  |
| 07 | PBLKO8               | PBLKO8               | 10/03/02         | 2355             | 5.39       | 24.67      |  |  |  |
| 08 | OBLCS                | 08LCS                | 10/04/02         | 0040             | 5.39       | 24.67      |  |  |  |
| 09 | O8LCSD               | O8LCSD               | 10/04/02         | 0125             | 5.38       | 24.66      |  |  |  |
| 10 | F01009LS13           | 502104               | 10/04/02         | 0210             | 5.39       | 24.67      |  |  |  |
| 11 | F01009LS12           | 502105               | 10/04/02         | 0255             | 5.38       | 24.66      |  |  |  |
| 12 | F01009LS11           | 502106               | 10/04/02         | 0340             | 5.38       | 24.66      |  |  |  |
| 13 | F01009LS23           | 502107               | 10/04/02         | 0425             | 5.38       | 24.66      |  |  |  |
| 14 | F01009LS22           | 502108               | 10/04/02         | 0510             | 5.38       | 24.65      |  |  |  |
| 15 | F01009LS21           | 502109               | 10/04/02         | 0555             | 5.38       | 24.66      |  |  |  |
| 16 | F01009LS33           | 502110               | 10/04/02         | 0640             | 5.39       | 24.66      |  |  |  |
| 17 | F01009LS32           | 502111               | 10/04/02         | 0725             | 5.39       | 24.66      |  |  |  |
| 18 | 32CONG-L3            | 32CONG-L3            | 10/04/02         | 0855             | 5.38       | 24.64      |  |  |  |
| 19 | PIBLK_SCU            | PIBLK_SCU            | 10/04/02         | 0940             | 5.39       | 24.66      |  |  |  |
| 20 | F01009LS31           | 502112               | 10/04/02         | 1025             | 5.38       | 24.65      |  |  |  |
| 21 | F01009LS43           | 502113               | 10/04/02         | 1110             | 5.38       | 24.66      |  |  |  |
| 22 | F01009LS42           | 502114               | 10/04/02         | 1155             | 5.38       | 24.66      |  |  |  |
| 23 | F01009LS41           | 502115               | 10/04/02         | 1241             | 5.38       | 24.65      |  |  |  |
|    | F01009LS53           | 502116               | 10/04/02         | 1326             | 5.38       | 24.65      |  |  |  |
| 25 | F01009LS52           | 502117               | 10/04/02         | 1411             | 5.38       | 24.66      |  |  |  |
| 26 | F01009LS51           | 502118               | 10/04/02         | 1456             | 5.39       | 24.66      |  |  |  |
| 27 | F01009LS63           | 502119               | 10/04/02         | 1541             | 5.37       | 24.64      |  |  |  |
| 28 | F01009LS62           | 502120               | 10/04/02         | 1626             | 5.38       | 24.65      |  |  |  |
| 29 | F01009LS61           | 502121               | 10/04/02         | 1711             | 5.39       | 24.66      |  |  |  |
| 30 | 32CONG-L3            | 32CONG-L3            | 10/04/02         | 1841             | 5.38       | 24.64      |  |  |  |
| 31 |                      |                      | <b> </b>         |                  |            |            |  |  |  |
| 32 |                      |                      | l                |                  |            |            |  |  |  |

QC LIMITS

S1 = Tetrachloro-meta-xylen (+/- 0.05 MINUTES)S2 = BZ#198 (+/- 0.05 MINUTES)

<sup>#</sup> Column used to flag retention time values with an asterisk.

<sup>\*</sup> Values outside of QC limits.

#### FORM 10 OTHER IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

CLIENT SAMPLE NO.

08LCS

Lab Name: STL BURLINGTON

Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.:

SDG No.: 89891

Lab Sample ID: O8LCS

Date(s) Analyzed: 10/04/02 10/04/02

| ANALYTE                                 | COL | RT     | RT W  | INDOW<br>TO | CONTRENEDAMENT | 0.5         |
|-----------------------------------------|-----|--------|-------|-------------|----------------|-------------|
| ======================================= | === | ====== | ===== | =====       | CONCENTRATION  | %D<br>===== |
| BZ#8                                    | 1   | 5.75   | 5.71  | 5.81        | 29             |             |
|                                         | 2   | 6.59   | 6.54  | 6.64        | 29             | 0.0         |
| BZ#18                                   | 1   | 6.69   | 67.65 | 6.75        | 29             |             |
|                                         | 2   | 7.70   | 7.65  | 7.75        | 29             | 0.0         |
| BZ#28                                   | 1   | 7.92   | 7.87  | 7.97        | 28             |             |
|                                         | 2   | 9.13   | 9.09  | 9.19        | 28             | 0.0         |
| BZ#44                                   | 1   | 9.66   | 9.62  | 9.72        | 29             |             |
| #1<br>12<br>1                           | 2   | 11.31  | 11.26 | 11.36       | 29             | 0.0         |
| BZ#52                                   | 1   | 8.98   | 8.93  | 9.03        | 29             |             |
|                                         | 2   | 10.34  | 10.29 | 10.39       | 29             | 0.0         |
| BZ#66                                   | 1   | 11.23  | 11.19 | 11.29       | 28             |             |
|                                         | 2   | 13.05  | 13.01 | 13.11       | 28             | 0.0         |
| BZ#77                                   | 1   | 13.74  | 13.70 | 13.80       | 28             |             |
|                                         | 2   | 16.07  | 16.03 | 16.13       | 28             | 0.0         |
| BZ#101                                  | 1   | 12.20  | 12.16 | 12.26       | 29             |             |
| 1. 4                                    | 2   | 13.91  | 13.86 | 13.96       | 29             | 0.0         |

#### CLIENT SAMPLE NO.

#### FORM 10 OTHER IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

Lab Name: STL BURLINGTON Contract: 22000 O8LCS

Lab Code: STLVT Case No.: 22000 SAS No.:

SDG No.: 89891

Lab Sample ID: O8LCS

Date(s) Analyzed: 10/04/02 10/04/02

|                                         |     |       | RT W   | INDOW |               |       |
|-----------------------------------------|-----|-------|--------|-------|---------------|-------|
| ANALYTE                                 | COL | RT    | FROM   | TO    | CONCENTRATION | %D    |
| ======================================= | === | ===== | =====  | ===== | =========     | ===== |
| BZ#105                                  | 1   | 16.15 | 16.11  | 16.21 | 28            |       |
|                                         | 2   | 18.71 | 18.67  | 18.77 | 28            | 0.0   |
| BZ#118                                  | 1   | 14.93 | 14:-89 | 14.99 | 28            |       |
|                                         | 2   | 17.07 | 17.02  | 17.12 | 28            | 0.0   |
| BZ#126                                  | 1   | 17.75 | 17.71  | 17.81 | 28            |       |
|                                         | 2   | 20.22 | 20.17  | 20.27 | 58            | 107.1 |
| BZ#128                                  | 1   | 18.64 | 18.60  | 18.70 | 29            |       |
|                                         | 2   | 21.46 | 21.41  | 21.51 | 29            | 0.0   |
| BZ#138                                  | 1   | 17.32 | 17.28  | 17.38 | 29            |       |
|                                         | 2   | 19.71 | 19.66  | 19.76 | 29            | 0.0   |
| BZ#153                                  | 1   | 15.99 | 15.94  | 16.04 | 58            |       |
| .c.                                     | 2   | 17.99 | 17.94  | 18.04 | 29            | 100.0 |
| BZ#170                                  | 1   | 22.26 | 22.22  | 22.32 | 29            |       |
|                                         | 2   | 25.00 | 24.95  | 25.05 | 28            | 3.6   |
| BZ#180                                  | 1   | 20.77 | 20.73  | 20.83 | 29            |       |
| 1                                       | 2   | 23.11 | 23.07  | 23.17 | 28            | 3.6   |

page 2 of 3

#### FORM 10 OTHER IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

CLIENT SAMPLE NO.

O8LCS

Lab Name: STL BURLINGTON Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

Lab Sample ID: O8LCS

Date(s) Analyzed: 10/04/02 10/04/02

|             |     |       |        | INDOW |               | 1     |
|-------------|-----|-------|--------|-------|---------------|-------|
| ANALYTE     | COL | RT    | FROM   | TO    | CONCENTRATION | 1     |
|             |     |       |        |       |               | ===== |
| BZ#187      | 1   | 18.16 | 18.12  | 18.22 | 29            |       |
|             | 2   | 20.22 | 20.17  | 20.27 | 58            | 100.0 |
|             |     |       |        |       |               |       |
| BZ#195      | 1   | 24.54 | 24.750 | 24.60 | 29            |       |
|             | 2   | 27.19 | 27.15  | 27.25 | 29            | 0.0   |
|             |     |       |        |       |               |       |
| BZ#206      | 1   | 27.64 | 27.61  | 27.71 | 29            |       |
|             | 2   | 29.80 | 29.76  | 29.86 | 29            | 0.0   |
|             |     |       |        |       |               |       |
| BZ#209      | 1   | 29.17 | 29.13  | 29.23 | 30            |       |
|             | 2   | 30.75 | 30.70  | 30.80 | 29            | 3.4   |
|             |     |       |        |       | 2.5           | 3.4   |
|             | 1   |       |        |       |               |       |
|             | 2   |       |        |       |               |       |
|             | -   |       |        |       | -             | - 1   |
|             | 1   |       |        |       | 52            |       |
|             | 2   |       |        |       |               |       |
|             | 2   |       |        |       |               |       |
|             | 1   |       |        |       |               |       |
|             | i   |       |        |       |               |       |
|             | 2   |       | 44     |       |               |       |
|             | 1   | ļ     |        |       |               |       |
|             |     |       |        |       |               |       |
|             | 2   |       |        |       |               | [     |
| page 3 of 3 |     |       | 1      | I,    |               | !     |

page 3 of 3

### FORM 10

OTHER IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

O8LCSD

Lab Name: STL BURLINGTON

Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.:

SDG No.: 89891

Lab Sample ID: O8LCSD

Date(s) Analyzed: 10/04/02 10/04/02

|         |     |       | RT W  |       |               |       |
|---------|-----|-------|-------|-------|---------------|-------|
| ANALYTE | COL | RT    | FROM  | TO    | CONCENTRATION | %D    |
|         | === | ===== | ===== | ===== | ==========    | ===== |
| BZ#8    | 1   | 5.75  | 5.71  | 5.81  | 32            |       |
|         | 2   | 6.58  | 6.54  | 6.64  | 32            | 0.0   |
|         |     | 0.36  | 0.54  | 0.04  | 32            | 0.0   |
| DZ#10   | ,   | c c0  | C:-CE | 6.75  | 32            |       |
| BZ#18   | 1   | 6.69  | 6∵65  | 6.75  | 32            |       |
|         | 2   | 7.68  | 7.65  | 7.75  | 32            | 0.0   |
|         |     |       |       |       |               |       |
| BZ#28   | 1   | 7.91  | 7.87  | 7.97  | 32            |       |
|         | 2   | 9.12  | 9.09  | 9.19  | 32            | 0.0   |
|         | 2   | 9.12  | 7.07  | 7.17  | 52            | 0.0   |
| 77114   |     | 0.65  | 0.60  | 0.70  | 22            |       |
| BZ#44   | 1   | 9.65  | 9.62  | 9.72  | 32            |       |
|         | 2   | 11.29 | 11.26 | 11.36 | 32            | 0.0   |
|         |     |       |       |       |               |       |
| BZ#52   | 1   | 8.97  | 8.93  | 9.03  | 32            |       |
|         | 2   | 10.33 | 10.29 | 10.39 | 32            | 0.0   |
| 9       | 2   | 10.33 | 10.29 | 10.39 | 32            | 0.0   |
|         |     |       |       | 1     | 20            |       |
| BZ#66   | 1   | 11.23 | 11.19 | 11.29 | 32            |       |
|         | 2   | 13.04 | 13.01 | 13.11 | 32            | 0.0   |
|         |     |       |       |       |               |       |
| BZ#77   | 1   | 13.73 | 13.70 | 13.80 | 32            | 3)    |
|         |     | 16.05 | 16.03 | 16.13 | 7 1           |       |
|         | 2   | 16.06 | 16.03 | 16.13 | 31            | 3.2   |
|         |     |       | :1    |       |               |       |
| BZ#101  | 1   | 12.19 | 12.16 | 12.26 | 33            |       |
|         | 2   | 13.89 | 13.86 | 13.96 | 32            | 3.1   |
|         | .   |       |       |       |               |       |

page 1 of 3

#### FORM 10 OTHER IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

CLIENT SAMPLE NO.

O8LCSD

Lab Name: STL BURLINGTON Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.:

SDG No.: 89891

Lab Sample ID: O8LCSD

Date(s) Analyzed: 10/04/02 10/04/02

|             |     |        | RT W           | INDOW          | W             |       |  |  |  |
|-------------|-----|--------|----------------|----------------|---------------|-------|--|--|--|
| ANALYTE     | COL | RT     | FROM           | TO             | CONCENTRATION | %D    |  |  |  |
|             | === | =====  | =====          | =====          | ==========    | ===== |  |  |  |
| BZ#105      | 1   | 16.14  | 16.11          | 16.21          | 32            |       |  |  |  |
|             | 2   | 18.70  | 18.67          | 18.77          | 32            | 0.0   |  |  |  |
| BZ#118      | 1   | 14.92  | 14:-89         | 14.99          | 32            |       |  |  |  |
|             | 2   | 17.06  | 17.02          | 17.12          | 32            | 0.0   |  |  |  |
| BZ#126      | 1   | 17.74  | 17.71          | 17.81          | 32            |       |  |  |  |
|             | 2   | 20.20  | 20.17          | 20.27          | 64            | 100.0 |  |  |  |
| BZ#128      | 1   | 18.63  | 18.60          | 18.70          | 33            |       |  |  |  |
|             | 2   | 21.44  | 21.41          | 21.51          | 33            | 0.0   |  |  |  |
| BZ#138      | ,   | 377 23 |                | 17 20          | 2.2           |       |  |  |  |
| 82#138      | 1 2 | 17.31  | 17.28<br>19.66 | 17.38<br>19.76 | 33            | 3.1   |  |  |  |
|             |     |        | 13.00          | 13.70          | 32            | 3.1   |  |  |  |
| BZ#153      | 1   | 15.98  | 15.94          | 16.04          | 65            |       |  |  |  |
|             | 2   | 17.97  | 17.94          | 18.04          | 32            | 103.1 |  |  |  |
| BZ#170      | 1   | 22.26  | 22.22          | 22.32          | 32            |       |  |  |  |
|             | 2   | 24.98  | 24.95          | 25.05          | 32            | 0.0   |  |  |  |
| BZ#180      | 1   | 20.76  | 20.73          | 20.83          | 32            |       |  |  |  |
|             | 2   | 23.09  | 23.07          | 23.17          | 31            | 3.2   |  |  |  |
| page 2 of 3 |     |        |                |                |               |       |  |  |  |

page 2 of 3

### FORM 10

CLIENT SAMPLE NO.

OTHER IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

Lab Name: STL BURLINGTON Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

Lab Sample ID: O8LCSD Date(s) Analyzed: 10/04/02 10/04/02

| ANALYTE | COL | RT<br>===== | RT WI<br>FROM | NDOW<br>TO | CONCENTRATION | %D   |
|---------|-----|-------------|---------------|------------|---------------|------|
| BZ#187  | 1   | 18.15       | 18.12         | 18.22      | 33            |      |
|         | 2   | 20.20       | 20.17         | 20.27      | 64            | 93.9 |
| BZ#195  | 1   | 24.53       | 24:-50        | 24.60      | 32            |      |
|         | 2   | 27.18       | 27.15         | 27.25      | 32            | 0.0  |
| BZ#206  | 1   | 27.64       | 27.61         | 27.71      | 32            |      |
|         | 2   | 29.79       | 29.76         | 29.86      | 32            | 0.0  |
| BZ#209  | 1   | 29.16       | 29.13         | 29.23      | 33            |      |
| 20,1207 | 2   | 30.73       | 30.70         | 30.80      | 32            | 3.1  |
|         | 1   |             |               |            |               |      |
|         | 2   |             |               |            |               |      |
|         |     |             |               |            |               |      |
|         | 1 2 |             |               |            |               |      |
|         |     |             |               |            |               | 79   |
|         | 1 2 |             |               |            |               |      |
|         |     |             |               |            |               |      |
|         | 1   |             |               |            |               |      |
| 2 of 2  | 2   |             |               |            |               |      |

page 3 of 3

Burlington

# INITIAL CALIBRATION DATA

Start Cal Date End Cal Date Quant Method

Target Version Integrator Method file Cal Date : 03-OCT-2002 18:40 : 03-OCT-2002 21:40 : ESTD : 3.50 : Falcon : /var/chem/3327 1.i/100302\_1 : 17-Oct-2002 09:09 rrm 1/030CT021607.b/32CONG\_3327RTX5\_RAW.m

Calibration File Names:
Level 1: /var/chem/3327\_1.i/1
Level 2: /var/chem/3327\_1.i/1
Level 3: /var/chem/3327\_1.i/1
Level 4: /var/chem/3327\_1.i/1
Level 5: /var/chem/3327\_1.i/1 .i/100302\_1/030CT021607.b/03oct021607-r041.d .i/100302\_1/030CT021607.b/03oct021607-r051.d .i/100302\_1/030CT021607.b/03oct021607-r061.d .i/100302\_1/030CT021607.b/03oct021607-r071.d .i/100302\_1/030CT021607.b/03oct021607-r081.d

II

| 19 BZ#153    | 13 BZ#114      | 14 BZ#118      | 15 BZ#123    | 8 BZ#77        | 10 BZ#87       | 9 BZ#81        | 11 BZ#101      | 7 BZ#66      | 4 BZ#44        | 5 BZ#49      | 6 BZ#52      | 3 BZ#28      | 2 BZ#18        | 1 82#8       | *************************               | Compound       |              |  |
|--------------|----------------|----------------|--------------|----------------|----------------|----------------|----------------|--------------|----------------|--------------|--------------|--------------|----------------|--------------|-----------------------------------------|----------------|--------------|--|
| 10078        | 5813           | 5223           | 5173         | 1793           | 9573           | 9573           | 6418           | 4874         | 7169           | 6883         | 6267         | 6346         | 5485           | 4361         |                                         | Level 1        | 5            |  |
|              |                |                | 28877        | 13528          |                | 52532          | •              |              |                |              | 27167        | _            | 23391          | 19673        | ======================================= | Level 2        | 25           |  |
| 90887        | 75046          | 56824          | 59725        | 30027          | 108105         | 108105         | 56841          | 56883        | 64075          | 58916]       | 51494        | 67104        | 43896          | 37982        | *************************************** | Level 3        | 50           |  |
| 169588       | 155557         | 109542         | 115477       | 60062          | 206589         | 206589         | 104848         | 114505       | 119217         | 107569       | 93848        | 133381       | 79801          | 71253        |                                         | Level 4        | 100          |  |
| 318510 WLINR | 318063   WLINR | 216245   WLINR | 228158 WLINR | 122197   WLINR | 397093   WLINR | 397093   WLINR | 196433   WLINR | 228856 WLINR | 223407   WLINR | 200601 WIINR | 172909 WLINR | 261113 MIINR | 146005   WLINR | 133093 WIINR | ======================================= | Level 5  Curve | 200          |  |
| -3.76716     | 1.67833        | -0.02579       | 0.31286      | 2.19296        | -0.21880       | -0.21880       | -2.13690       | 0.87139      | -1.92159       | -2.48021     | -2.92610     | 0.13508      | -3.23413       | -2.04469     |                                         | ъ              | 0            |  |
| 0.00122      | 0.00063        | 0.00091        | 0.00087      | 0.00162        | 0.00098        | 0.00098        | 0.00099        | 0.00087      | 0.00087        | 0.00097      | 0.00112      | 0.00076      | 0.00133        | 0.00147      |                                         | ml m2          | Coefficients |  |
| 0.99709      | 0.99946        | 0.99956        | 0.99959      | 0.99983        | 0.99869        | 0.99869        | 0.99659        | 0.99988      | 0.99718        | 0.99618      | 0.99536      | 0.99980      | 0.99477        | 0.99732      |                                         | or R^2         | *RSD         |  |

1

STL Burlington

# INITIAL CALIBRATION DATA

Start Cal Date
End Cal Date
Quant Method
Target Version
Integrator
Method file
Cal Date

03-OCT-2002 18:40 03-OCT-2002 21:40 ESTD 3.50 Falcon Falcon /var/chem/3327\_1.i/100302\_1/03OCT021607.b/32CONG\_3327RTX5\_RAW.m

| -     | J |
|-------|---|
| Date  | 1 |
| ••    |   |
| . /   | 1 |
| ä     |   |
|       | ) |
|       | ) |
| 09:09 | ` |
| y rrm |   |
|       |   |

|         |                                         |          |                                        |             | -         |         |         |         |                               |
|---------|-----------------------------------------|----------|----------------------------------------|-------------|-----------|---------|---------|---------|-------------------------------|
| 0.99831 | 0.00070                                 | -1.65436 | 281488   WLINR                         | 149386 2    |           | 78261   | 40100   | 8851    | \$ 34 BZ#198                  |
| 0.99871 | 0.00032                                 | _        | 615745   WLINR                         | 321637 6    | _         | 166684  | 80682   | 14229   | \$ 33 Tetrachloro-meta-xylene |
|         | *====================================== |          | ## ## ## ## ## ## ## ## ## ## ## ## ## | II.         |           | 11      |         |         |                               |
| 0.99403 | 0.00069                                 | -3.43434 | 280082   WLINR                         | 152724 2    | _         | 85234   | 45643   | 10693   | 32 BZ#209                     |
| 0.99784 | 0.00073                                 | -2.23142 | 271038   WLINR                         | _           | )  142431 | 76390   | 40401   | 9085    | 31 BZ#206                     |
| 0.99850 | 0.00066                                 | -1.30019 | 299152   WLINR                         | 156012  2   | _         | 83155   | 41606   | 8894    | 30 BZ#195                     |
| 0.99981 | 0.00073                                 | -0.18952 | 272731   WLINR                         | _           | 136042    | 70565   | 34863   | 6905    | 29 BZ#189                     |
| 0.99900 | 0.00068                                 | -0.59573 | 287305   WLINR                         | _           | 149808    | 77513   | 38708   | 7654    | 24 BZ#170                     |
| 0.99978 | 0.00110                                 | 0.05400  | 180982   WLINR                         | 90585 1     | _         | 46713   | 23175   | 4338    | 23 BZ#169                     |
| 0.99923 | 0.00072                                 | -0.90257 | 274674   WLINR                         | 140107 2    | _         | 74182   | 37039   | 7726    | 25 BZ#180                     |
| 0.99974 | 0.00073                                 | _        | 274322   WLINR                         | 134104 2    |           | 68103   | 31568   | 5768    | 21 BZ#157                     |
| 0.99936 | 0.00072                                 | 1.39830  | 281219 WLINR                           | 135185  21  | •         | _       | 30981   | 5487    | 20 BZ#156                     |
| 0.99913 | 0.00088                                 | -0.52304 | 223579 WLINR                           | 115129  2:  | ,         | 60027   | 30119   | 5848    | 22 BZ#167                     |
| 0.99926 | 0.00068                                 | -0.10137 | 290932   WLINR                         | _           | 150261    | 77683   | 37607   | 7163    | 17 BZ#128                     |
| 0.99854 | 0.00078                                 | -1.42691 | 254098   WLINR                         | _           | 130881    | 70353   | 35897   | 7632    | 26 BZ#183                     |
| 0.99693 | 0.00086                                 | -2.22391 | 226089 WLINR                           | _           | 120830    | 64933   | 34130   | 7520    | 28 BZ#187                     |
| 0.99974 | 0.00146                                 | 1.66247  | 137164   WLINR                         | 66395 1:    | _         | 33598   | 15457   | 2383    | 16 BZ#126                     |
| 0.99891 | 0.00076                                 | -0.75337 | 259588   WLINR                         | _           | 135647    | 70198   | 35442   | 7081    | 18 BZ#138                     |
| 0.99941 | 0.00072                                 | 1.78495  | 279070 WLINR                           | _           | 134702    | 65716   | 30284   | 4932    | 12 BZ#105                     |
| 0.99709 | 0.00122                                 | -3.76716 | 318510 WLINR                           | _           | 169588    | 90887   | 47431   | 10078   | 27 BZ#184                     |
|         | *************************************** |          |                                        | П           |           |         |         |         |                               |
| or R^2  | m1 m2                                   | ъ        | 1 5  Curve                             | 4   Level 5 | Level 4   | Level 3 | Level 2 | Level 1 | Compound                      |
| *RSD    | Coefficients                            | Coe1     | o<br>                                  | 200         | 100       | 50      | 25      | 5       |                               |
|         |                                         |          |                                        |             |           |         |         |         |                               |

1 4

STL Burlington

# INITIAL CALIBRATION DATA

Start Cal Date End Cal Date Quant Method Target Version Integrator Method file Cal Date

03-OCT-2002 18:40 03-OCT-2002 21:40 ESTD 3.50 Falcon /var/chem/3327\_1.i/100302\_1/03OCT021607.b/32CONG\_3327RTX5\_RAW.m 17-Oct-2002 09:09 rrm

| Wt Linear   Amt = b + ml*Rsp | Curve Formula |
|------------------------------|---------------|
| Amount                       | <br>Units     |

#### STL Burlington

#### COMPOUND LISTING

Method file : /var/chem/3327\_1.i/100302\_1/030CT021607.b/32CONG\_3327RTX5\_1

Target Version : 3.50 Quant Method : ESTD

Last Update : 17-Oct-2002 09:09

Data Type : GC DATA Number of Cpnds: 34

Data Type : GC DATA

Global Integrator : Falcon

Values Chromat Events \_\_\_\_\_ Initial:Start Threshold 19.000000 Initial:End Threshold 9.500000 Initial:Area Threshold 190.000000 Initial:P-P Resolution 1.000000 5.000000 Initial:Bunch Factor

OFF Initial:Negative Peaks

2.000000 ... 4 Initial: Tension

| Cc    | mpound                  | RT     | RT Window     | RF        |
|-------|-------------------------|--------|---------------|-----------|
|       |                         |        |               |           |
| \$ 33 | Tetrachloro-meta-xylene | 5.001  | 4.951-5.051   | 3.165e-04 |
| 1     | BZ#8                    | 5.761  | 5.711-5.811   | 1.465e-03 |
| 2     | BZ#18                   | 6.701  | 6.651-6.751   | 1.327e-03 |
| 3     | BZ#28                   | 7.925  | 7.875-7.975   | 7.582e-04 |
|       | BZ#52                   | 8.984  | 8.934-9.034   | 1.122e-03 |
|       | BZ#49                   | 9.122  | 9.072-9.172   | 9.699e-04 |
|       | BZ#44                   | 9.667  | 9.617-9.717   | 8.721e-04 |
|       | BZ#66                   | i .    | 11.193-11.293 |           |
|       | BZ#101                  |        | 12.157-12.257 |           |
|       | BZ#81                   | 13.318 | 13.268-13.368 | 9.835e-04 |
|       | BZ#87                   |        | 13.268-13.368 |           |
|       | BZ#77                   |        | 13.702-13.802 |           |
|       | BZ#123                  |        | 14.775-14.875 |           |
|       | BZ#118                  |        | 14.888-14.988 |           |
|       | BZ#114                  |        | 15.378-15.478 |           |
|       | BZ#153                  | 1      | 15.943-16.043 | i e       |
|       | BZ#184                  | i .    | 15.943-16.043 |           |
|       | BZ#105                  |        | 16.105-16.205 |           |
| 18    |                         | 1      | 17.278-17.378 | i         |
|       | BZ#126                  |        | 17.712-17.812 |           |
|       | BZ#187                  | l .    | 18.120-18.220 |           |
|       | BZ#183                  |        | 18.366-18.466 |           |
|       | BZ#128                  | •      | 18.597-18.697 | 1         |
|       | BZ#167                  |        | 18.710-18.810 |           |
|       | 22,1207                 | -0.,00 | ]             |           |
|       |                         | l      | 1             | l         |

1 4

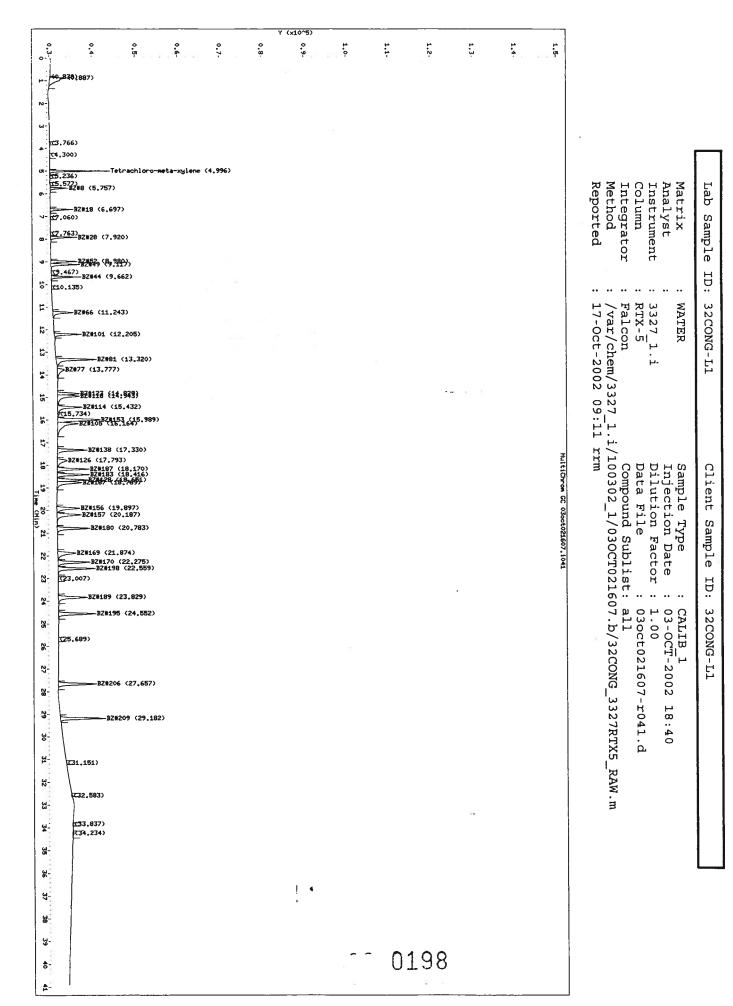
#### STL Burlington

#### COMPOUND LISTING

Method file

: /var/chem/3327\_1.i/100302\_1/030CT021607.b/32CONG\_3327RTX5\_

| Compound                                                                                                                          | RT                                                                                 | RT Window                                                                                                                                                              | RF                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| 20 BZ#156<br>21 BZ#157<br>25 BZ#180<br>23 BZ#169<br>24 BZ#170<br>\$ 34 BZ#198<br>29 BZ#189<br>30 BZ#195<br>31 BZ#206<br>32 BZ#209 | 20.174-<br>20.781-<br>21.854-<br>22.271<br>22.559-<br>23.820<br>24.552-<br>27.655- | 19.836-19.936<br>20.124-20.224<br>20.731-20.831<br>21.804-21.904<br>22.221-22.321<br>22.509-22.609<br>23.770-23.870<br>24.502-24.602<br>27.605-27.705<br>29.130-29.230 | 7.303e-04<br>7.204e-04<br>1.098e-03<br>6.827e-04<br>6.957e-04<br>7.310e-04<br>6.564e-04<br>7.252e-04 |



Lab Sample ID: 32CONG-L1 Client Sample ID: 32CONG-L1

Matrix : WATER
Analyst : 0 ~
Instrument : 3327\_1.i Sample Type : CALIB 1

Injection Date : 03-OCT-2002 18:40

Dilution Factor: 1.00

 $\begin{array}{cccc} \text{Column} & : & \text{RTX-}\overline{5} \\ \text{Integrator} & : & \text{Falcon} \\ \end{array}$ Data File : 03oct021607-r041.d

Compound Sublist: all

Method : /var/chem/3327\_1.i/100302\_1/03OCT021607.b/32CONG\_3327RTX5\_RAW.m Reported : 17-Oct-2002 09:11 rrm

Peaks

|      | _      |        |          |        |              |              | Extract            |       |                                         |
|------|--------|--------|----------|--------|--------------|--------------|--------------------|-------|-----------------------------------------|
| Peal |        | Peak   | Expected | Delta  |              |              | Conc.              |       |                                         |
| No   |        | RT     | RT       | RT     | Area         | Height       | (ppb)              | Flags | Peak Identification                     |
| ===: |        |        |          |        |              | =======      | *******            | ===== | ======================================= |
|      | 1      | 0.838  |          |        | 334          | 202          |                    |       |                                         |
|      | 2      | 0.887  |          |        | 37382        | 3994         |                    |       |                                         |
|      | 3      | 3.766  |          |        | 850          | 280          |                    |       |                                         |
| \$   | 4<br>5 | 4.300  | E 001    | 0 004  | 854          | 117          | 4 54500            | _     |                                         |
| ş    | 6      | 5.236  | 5.001    | -0.004 | 37074        | 14229        | 4.61522            | R     | Tetrachloro-meta-xylene                 |
|      | 7      | 5.577  |          |        | 409          | 122          |                    |       |                                         |
|      | 8      | 5.757  | 5.761    | -0.004 | 468          | 165          | 4 24400            |       | Balla.                                  |
|      | 9      | 6.697  | 6.701    | -0.004 | 13922        | 4361         | 4.34422            | 2 6   | BZ#8                                    |
|      | 10     | 7.060  | 6.701    | -0.004 | 17546<br>439 | 5485         | 4.04369            |       | BZ#18                                   |
|      | 11     | 7.763  |          |        | 365          | 127          |                    |       |                                         |
|      | 12     | 7.920  | 7.925    | -0.004 | 22450        | 108          | 4 04633            |       | 77/100                                  |
|      | 13     | 8.980  | 8.984    | -0.004 | 22262        | 6346<br>6267 | 4.94632            |       | BZ#28                                   |
|      | 14     | 9.117  | 9.122    | -0.004 | 26347        |              | 4.10619            |       | BZ#52                                   |
|      | 15     | 9.467  | 7.122    | -0.004 | 26347<br>519 | 6883<br>112  | 4.19536            |       | BZ#49                                   |
|      | 16     | 9.662  | 9.667    | -0.004 | 26568        | 7169         | 4 22072            |       | DGHAA                                   |
|      | 17     | 10.135 | 3.007    | 0.004  | 340          | 80           | 4.33073            |       | BZ#44                                   |
|      | 18     | 11.243 | 11.243   | 0.000  | 24688        | 4874         | E 11046            | м     | P7#66                                   |
|      | 19     | 12.205 | 12.207   | -0.002 | 27807        | 6418         | 5.11045<br>4.22357 | M     | BZ#66                                   |
|      | 20     | 13.320 | 13.318   | 0.002  | 51615        | 9573         | 9.19589            | м     | BZ#101                                  |
|      | 20     | 13.320 | 13.318   | 0.002  | 51615        | 9573         | 9.19589            |       | BZ#81                                   |
|      | 21     | 13.777 | 13.752   | 0.024  | 18490        | 1793         | 5.10007            |       | BZ#87<br>BZ#77                          |
|      | 22     | 14.829 | 14.825   | 0.004  | 24177        | 5173         | 4.78841            | M     | BZ#123                                  |
|      | 23     | 14.943 | 14.938   | 0.004  | 36806        | 5223         | 4.74888            | -M    |                                         |
|      | 24     | 15.432 | 15.428   | 0.004  | 34053        | 5813         | 5.34511.           |       | BZ#118<br>BZ#114                        |
|      | 25     | 15.734 |          | 0.001  | 2495         | 339          | 3.34311,           | 1-1   | 524114                                  |
|      | 26     | 15.989 | 15.993   | -0.004 | 65435        | 10078        | 8.56463            | м     | BZ#153                                  |
|      | 26     | 15.989 | 15.993   | -0.004 | 65435        | 10078        | 8.56463            | M     | BZ#184                                  |
|      | 27     | 16.164 | 16.155   | 0.009  | 45565        | 4932         | 5.34067            |       | BZ#105                                  |
|      | 28     | 17.330 | 17.328   | 0.002  | 37735        | 7081         | 4.59641            | ••    | BZ#138                                  |
|      | 29     | 17.793 | 17.762   | 0.031  | 21189        | 2383         | 5.13597            |       | BZ#126                                  |
| 3    | 30     | 18.170 | 18.170   | 0.000  | 36998        | 7520         | 4.26166            |       | BZ#187                                  |
| 3    | 31     | 18.416 | 18.416   | 0.000  | 37537        | 7632         |                    | М     | BZ#183                                  |
| 3    | 32     | 18.651 | 18.647   | 0.004  | 34475        | 7163         |                    | M     | BZ#128                                  |
| 3    | 33     | 18.769 | 18.760   | 0.009  | 38278        | 5848         | 4.62424            |       | BZ#167                                  |
| 3    | 34     | 19.897 | 19.886   | 0.011  | 34190        | 5487         | 5.33710            |       | BZ#156                                  |
| 3    | 35     | 20.187 | 20.174   | 0.013  | 38455        | 5768         | 5.15618            |       | BZ#157                                  |
| 3    | 36     | 20.783 | 20.781   | 0.002  | 42328        | 7726         | 4.66346            |       | BZ#180                                  |
| 3    | 37     | 21.874 | 21.854   | 0.020  | 33668        | 4338         | 4.81774            |       | BZ#169                                  |
| 3    | 38     | 22.275 | 22.271   | 0.004  | 42973        | 7654         | 4.62954            |       | BZ#170                                  |
| \$ 3 | 39     | 22.559 | 22.559   | 0.000  | 47334        | 8851         | 4.50346            | R     | BZ#198                                  |
| 4    | 40     | 23.007 |          |        | 838          | 133          |                    |       | <del></del>                             |
| 4    | 41     | 23.829 | 23.820   | 0.009  | 41832        | 6905         | 4.85829            |       | BZ#189                                  |
| 4    | 42     | 24.552 | 24.552   | 0.000  | 47678        | 8894         | 4.53783            | ~     | BZ#195                                  |
| 4    | 43     | 25.689 |          |        | 542          | 107          |                    |       | <del></del>                             |
| 4    | 44     | 27.657 | 27.655   | 0.002  | 50817        | 9085         | 4.35743            |       | BZ#206                                  |
|      | 15     | 29.182 | 29.180   | 0.002  | 49648        | 10693        | 3.95969            | M     | BZ#209                                  |
| 4    | 46     | 31.151 |          |        | 386          | 97           |                    |       |                                         |
| 4    | 17     | 32.583 |          |        | 1292         | 246          |                    |       |                                         |
| 4    | 48     | 33.837 |          |        | 935          | 149          |                    |       |                                         |
| 4    | 49     | 34.234 |          |        | 2401         | 231          |                    |       |                                         |

Flags: A - Peak quantitates above calibration range a - Peak quantitates below reporting limit

Target Compounds

| Peak   | Expected |                         |
|--------|----------|-------------------------|
| RT     | RT       | Target Compound         |
|        |          | ************            |
| 4.996  | 5.001    | Tetrachloro-meta-xylene |
| 5.757  | 5.761    | BZ#8                    |
| 6.697  | 6.701    | BZ#18                   |
| 7.920  | 7.925    | BZ#28                   |
| 8.980  | 8.984    | BZ#52                   |
| 9.117  | 9.122    | BZ#49                   |
| 9.662  | 9.667    | BZ#44                   |
| 11.243 | 11.243   | BZ#66                   |
| 12.205 | 12.207   | BZ#101                  |
| 13.320 | 13.318   | BZ#87                   |
| 13.320 | 13.318   | BZ#81                   |
| 13.777 | 13.752   | BZ#77                   |
| 14.827 | 14.825   | BZ#123                  |
| 14.943 | 14.938   | BZ#118                  |
| 15.432 | 15.428   | BZ#114                  |
| 15.989 | 15.993   | BZ#153                  |
| 15.989 | 15.993   | BZ#184                  |
| 16.164 | 16.155   | BZ#105                  |
| 17.330 | 17.328   | BZ#138                  |
| 17.793 | 17.762   | BZ#126                  |
| 18.170 | 18.170   | BZ#187                  |
| 18.414 | 18.416   | BZ#183                  |
| 18.651 | 18.647   | BZ#128                  |
| 18.769 | 18.760   | BZ#167                  |
| 19.897 | 19.886   | BZ#156                  |
| 20.187 | 20.174   | BZ#157                  |
| 20.783 | 20.781   | BZ#180                  |
| 21.874 | 21.854   | BZ#169 .                |
| 22.275 | 22.271   | BZ#170                  |
| 22.559 | 22.559   | BZ#198                  |
| 23.829 | 23.820   | BZ#189                  |
| 24.552 | 24.552   | BZ#195                  |
| 27.657 | 27.655   | BZ#206                  |
| 29.182 | 29.180   | BZ#209                  |

H - User selected alternate compound hit

M - Peak manually integrated or manually identified R - Peak fails recovery

U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

Method Integrator Column Instrument Analyst Matrix

3327\_1. RTX-5

Injection Date
Dilution Factor
Data File

1.00

CALIB\_2 03-OCT-2002

19:25

Sample Type

Compound Sublist: all

03oct021607-r051.d

WATER

Falcon

/var/chem/3327\_

Lab

Sample

ID:

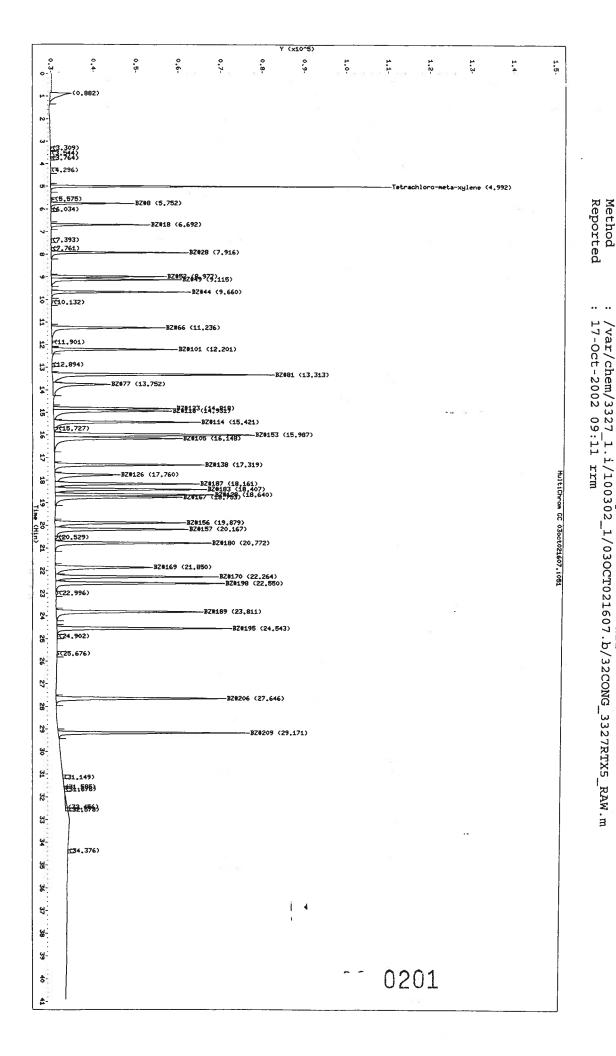
32CONG-L2

Client

Sample

ID:

32CONG-L2



Lab Sample ID: 32CONG-L2 Client Sample ID: 32CONG-L2

Matrix : WATER Sample Type : CALIB\_2

Analyst : Injection Date : 03-OCT-2002 19:25

Instrument : 3327\_1.i Dilution Factor : 1.00

Column :  $RTX-\overline{5}$  Data File : 03oct021607-r051.d

Integrator : Falcon Compound Sublist: all

Method : /var/chem/3327\_1.i/100302\_1/030CT021607.b/32CONG\_3327RTX5\_RAW.m

Peaks

Reported : 17-Oct-2002 09:11 rrm

|             |                |          |        |                |             | Extract |       |                         |
|-------------|----------------|----------|--------|----------------|-------------|---------|-------|-------------------------|
| Peak        | Peak           | Expected | Delta  |                |             | Conc.   |       |                         |
| No.         | RT             | RT       | RT     | Area           | Height      | (ppb)   | Flags | Peak Identification     |
|             | =======        | =======  | ====== |                |             |         |       |                         |
| 1           | 0.882          |          |        | 45161          | 5060        |         |       |                         |
| 2           | 3.309          |          |        | 1012           | 302         |         |       |                         |
| 3           | 3.544          |          |        | 489            | 141         |         |       |                         |
| 4           | 3.764          |          |        | 613            | 205         |         |       |                         |
| 5           | 4.296          |          |        | 744            | 108         |         | _     |                         |
| \$ 6        | 4.992          | 5.001    | -0.009 | 202322         | 80682       | 25.6455 | R     | Tetrachloro-meta-xylene |
| 7           | 5.575          |          |        | 2636           | 821         |         |       | 2210                    |
| 8           | 5.752          | 5.761    | -0.009 | 60511          | 19673       | 26.7765 |       | BZ#8                    |
| 9           | 6.034          | 6 701    | 0.000  | 607            | 152         | 27 0024 | (0)   | D7#10                   |
| 10          | 6.692          | 6.701    | -0.009 | 74748          | 23391       | 27.8024 |       | BZ#18                   |
| 11          | 7.393          |          |        | 674            | 227<br>241  |         |       |                         |
| 12<br>11 13 | 7.761<br>7.916 | 7.925    | -0.009 | 812<br>108049  | 32383       | 24.6864 |       | BZ#28                   |
| 14          | 8.977          | 8.984    | -0.009 | 95930          | 27167       | 27.5584 |       | BZ#52                   |
| 15          | 9.115          | 9.122    | -0.007 | 115235         | 30625       | 27.2219 |       | BZ#49                   |
| 16          | 9.660          | 9.667    | -0.007 | 120931         | 32862       | 26.7384 |       | BZ#44                   |
| 17          | 10.132         | 3.007    | -0.007 | 1167           | 307         | 20.7501 |       | 22#11                   |
| 18          | 11.236         | 11.243   | -0.007 | 126146         | 26790       | 24.1714 | м     | BZ#66                   |
| 19          | 11.901         | 11.2.5   | 0.007  | 1554           | 315         |         |       | 22,,33                  |
| 20          | 12.201         | 12.207   | -0.007 | 127908         | 29678       | 27.2751 | М     | BZ#101                  |
| 21          | 12.894         |          |        | 375            | 85          |         |       |                         |
| 22          | 13.313         | 13.318   | -0.004 | 257131         | 52532       | 51.4445 |       | BZ#81                   |
| 22          | 13.313         | 13.318   | -0.004 | 257131         | 52532       | 51.4445 | М     | BZ#87                   |
| 23          | 13.752         | 13.752   | 0.000  | 101645         | 13528       | 24.1268 |       | BZ#77                   |
| 24          | 14.818         | 14.825   | -0.007 | 126905         | 28877       | 25.2965 |       | BZ#123                  |
| 25          | 14.931         | 14.938   | -0.007 | 155526         | 27988       | 25.5598 |       | BZ#118                  |
| 26          | 15.421         | 15.428   | -0.007 | 168726         | 34637       | 23.5270 |       | BZ#114                  |
| 27          | 15.727         |          |        | 5743           | 887         |         |       |                         |
| 28          | 15.987         | 15.993   | -0.007 | 290917         | 47431       | 54.2710 |       | BZ#153                  |
| 28          | 15.987         | 15.993   | -0.007 | 290917         | 47431       | 54.2710 | M     | BZ#184                  |
| 29          | 16.148         | 16.155   | -0.007 | 172085         | 30284       | 23.6182 |       | BZ#105                  |
| 30          | 17.319         | 17.328   | -0.009 | 172697         | 35442       | 26.0235 |       | BZ#138                  |
| 31          | 17.760         | 17.762   | -0.002 | 109183         | 15457       | 24.1928 |       | BZ#126                  |
| 32          | 18.161         | 18.170   | -0.009 | 167392         | 34130       | 27.2113 |       | BZ#187                  |
| 33          | 18.407         | 18.416   | -0.009 | 172816         | 35897       | 26.4305 |       | BZ#183                  |
| 34          | 18.640         | 18.647   | -0.007 | 173824         | 37607       | 25.2864 |       | BZ#128                  |
| 35          | 18.753         | 18.760   | -0.007 | 171039         | 30119       | 25.9870 |       | BZ#167                  |
| 36          | 19.879         | 19.886   | -0.007 | 167468         | 30981       | 23.6378 |       | BZ#156                  |
| 37          | 20.167         | 20.174   | -0.007 | 180468         | 31568       | 23.9982 |       | BZ#157                  |
| 38          | 20.529         |          |        | 3441           | 547         |         |       |                         |
| 39          | 20.772         | 20.781   | -0.009 | 190218         | 37039       | 25.7814 |       | BZ#180                  |
| 40          | 21.850         | 21.854   | -0.004 | 153795         | 23175       | 25.5034 |       | BZ#169                  |
| 41          | 22.264         | 22.271   | -0.007 | 198101         | 38708       | 25.8297 | _     | BZ#170                  |
| \$ 42       | 22.550         | 22.559   | -0.009 | 207793         | 40100       | 26.2440 | R.    | BZ#198                  |
| 43          | 22.996         |          |        | 3498           | 542         | 25 2266 |       | DG#100                  |
| 44          | 23.811         | 23.820   | -0.009 | 193959         | 34863       | 25.2966 |       | BZ#189                  |
| 45          | 24.543         | 24.552   | -0.009 | 215881         | 41606       | 26.0100 | נייו  | BZ#195                  |
| 46          | 24.902         |          |        | 1369           | 213         |         |       |                         |
| 47          | 25.676         | 22 655   | 0 000  | 2507           | 460         | 22 0600 |       | P7#206                  |
| 48          | 27.646         | 27.655   | -0.009 | 222799         | 40401       | 27.0692 | м     | BZ#206<br>BZ#209        |
| 49          | 29.171         | 29.180   | -0.009 | 2,08245<br>207 | 45643<br>45 | 28.1270 | 171   | D2#2 V 3                |
| 50<br>51    |                |          |        |                | .126        |         |       |                         |
| 51<br>52    |                |          |        | 418<br>687     | .126        |         |       |                         |
| 53          |                |          |        | 10055          | 479         | 0202    |       |                         |
| 23          | 22.430         |          |        | 10033          | 1.0         | 0202    |       |                         |
|             |                |          |        |                |             |         |       |                         |

#### STL Burlington - Target GC Injection Report

|       |         |          |         |         |         | Extract |       |                     |
|-------|---------|----------|---------|---------|---------|---------|-------|---------------------|
| Peak  | Peak    | Expected | Delta   |         |         | Conc.   |       |                     |
| No.   | RT      | RT       | RT      | Area    | Height  | (ppb)   | Flags | Peak Identification |
| ===== | ======= | ======   | ======= | ======= | ======= |         |       |                     |
| 54    | 32.578  |          |         | 4098    | 597     |         |       |                     |
| 55    | 34.376  |          |         | 1174    | 210     |         |       |                     |

Flags: A - Peak quantitates above calibration range

a - Peak quantitates below reporting limitH - User selected alternate compound hit

 $\ensuremath{\mathrm{M}}$  - Peak manually integrated or manually identified

R - Peak fails recovery

U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

| _     |     |          | _  |
|-------|-----|----------|----|
| Targe | · 🕇 | Compound | 79 |

| Peak   | Expected |                         |
|--------|----------|-------------------------|
| RT     | RT       | Target Compound         |
| ====== | =======  |                         |
| 4.992  | 5.001    | Tetrachloro-meta-xylene |
| 5.752  | 5.761    | BZ#8                    |
| 6.692  | 6.701    | BZ#18                   |
| 7.916  | 7.925    | BZ#28                   |
| 8.977  | 8.984    | BZ#52                   |
| 9.115  | 9.122    | BZ#49                   |
| 9.660  | 9.667    | BZ#44                   |
| 11.236 | 11.243   | BZ#66                   |
| 12.201 | 12.207   | BZ#101                  |
| 13.313 | 13.318   | BZ#87                   |
| 13.313 | 13.318   | BZ#81                   |
| 13.752 | 13.752   | BZ#77                   |
| 14.818 | 14.825   | BZ#123                  |
| 14.931 | 14.938   | BZ#118                  |
| 15.421 | 15.428   | BZ#114                  |
| 15.987 | 15.993   | BZ#153                  |
| 15.987 | 15.993   | BZ#184                  |
| 16.148 | 16.155   | BZ#105                  |
| 17.319 | 17.328   | BZ#138                  |
| 17.760 | 17.762   | BZ#126                  |
| 18.161 | 18.170   | BZ#187                  |
| 18.407 | 18.416   | BZ#183                  |
| 18.640 | 18.647   | BZ#128                  |
| 18.753 | 18.760   | BZ#167                  |
| 19.879 | 19.886   | BZ#156                  |
| 20.167 | 20.174   | BZ#157                  |
| 20.772 | 20.781   | BZ#180                  |
| 21.850 | 21.854   | BZ#169                  |
| 22.264 | 22.271   | BZ#170                  |
| 22.550 | 22.559   | BZ#198                  |
| 23.811 | 23.820   | BZ#189                  |
| 24.543 | 24.552   | BZ#195                  |
| 27.646 | 27.655   | BZ#206                  |
| 29.171 | 29.180   | BZ#209                  |

Column

Instrument Analyst Matrix

3327\_1.i RTX-5

Falcon

Lab

Sample

ID:

32CONG-L3

Client

Sample

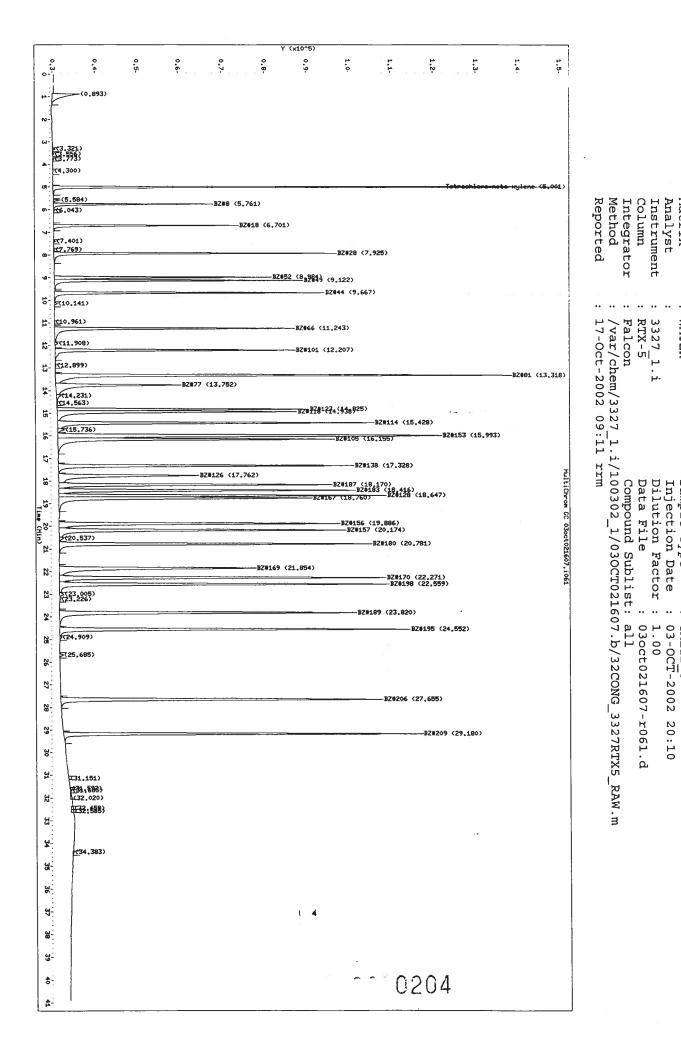
ID:

32CONG-L3

WATER

Sample Type

CALIB



Lab Sample ID: 32CONG-L3 Client Sample ID: 32CONG-L3

Matrix : WATER

Sample Type : CALIB\_3
Injection Date : 03-OCT-2002 20:10 Analyst

Analyst : [m.]
Instrument : 3327\_1.i Dilution Factor: 1.00

: RTX-5 Column Data File : 03oct021607-r061.d

Integrator : Falcon Compound Sublist: all

: /var/chem/3327\_1.i/100302\_1/030CT021607.b/32CONG\_3327RTX5\_RAW.m Method

Peaks

Reported : 17-Oct-2002 09:11 rrm

| <b>.</b> |        | _        |       |        |        | Extract  |        |                                        |
|----------|--------|----------|-------|--------|--------|----------|--------|----------------------------------------|
| Peak     | Peak   | Expected | Delta |        |        | Conc.    |        |                                        |
| No.      | RT     | RT       | RT    | Area   | Height | (ppb)    | Flags  | Peak Identification                    |
| 1        | 0.893  | 30553355 |       | 54481  | 6509   | ======== | =====  | ###################################### |
| 2        | 3.321  |          |       | 2032   | 611    |          |        |                                        |
| 3        | 3.556  |          |       | 879    | 282    |          |        |                                        |
| 4        | 3.773  |          |       | 801    | 274    |          |        |                                        |
| 5        | 4.300  |          |       | 708    | 112    |          |        |                                        |
| \$ 6     | 5.001  | 5.001    | 0.000 | 424411 | 166684 | 52.8625  | R      | Tetrachloro-meta-xylene                |
| 7        | 5.584  |          |       | 5298   | 1652   | 32.0023  | •      | rectaentoro-meta-xyrene                |
| 8        | 5.761  | 5.761    | 0.000 | 114029 | 37982  | 53.5994  |        | BZ#8                                   |
| 9        | 6.043  |          |       | 1144   | 289    | ***      |        | 32 H G                                 |
| 10       | 6.701  | 6.701    | 0.000 | 139142 | 43896  | 55.0096  |        | BZ#18                                  |
| 11       | 7.401  |          |       | 1385   | 461    | 33.0030  |        | 22,110                                 |
| 12       | 7.769  |          |       | 796    | 236    |          |        |                                        |
| 13       | 7.925  | 7.925    | 0.000 | 220719 | 67104  | 51.0102  |        | BZ#28                                  |
| 14       | 8.984  | 8.984    | 0.000 | 180478 | 51494  | 54.8560  |        | BZ#52                                  |
| 15       | 9.122  | 9.122    | 0.000 | 219582 | 58916  | 54.6603  |        | BZ#49                                  |
| 16       | 9.667  | 9.667    | 0.000 | 235900 | 64075  | 53.9603  |        | BZ#44                                  |
| 17       | 10.141 | ,,,,,,   | 0.000 | 3090   | 695    | 33.3003  |        | 82#11                                  |
| 18       | 10.961 |          |       | 455    | 120    |          |        |                                        |
| 19       | 11.243 | 11.243   | 0.000 | 251426 | 56883  | 50.3442  |        | BZ#66                                  |
| 20       | 11.908 | 11.215   | 0.000 | 4083   | 726    | 30.3442  |        | 82#00                                  |
| 21       | 12.207 | 12.207   | 0.000 | 248459 | 56841  | 54.1946  |        | D7#101                                 |
| 22       | 12.899 | 12.207   | 0.000 | 886    | 200    | 34.1340  |        | BZ#101                                 |
| 23       | 13.318 | 13.318   | 0.000 | 506970 | 108105 | 106.098  | w      | D7#01                                  |
| 23       | 13.318 | 13.318   | 0.000 | 506970 | 108105 | 106.098  | M<br>M | BZ#81                                  |
| 24       | 13.752 | 13.752   | 0.000 | 192270 | 30027  |          |        | BZ#87                                  |
| 25       | 14.231 | 13.752   | 0.000 | 8619   | 942    | 50.8778  | M      | BZ#77                                  |
| 26       | 14.563 |          |       |        |        |          |        |                                        |
| 27       |        | 14 025   | 0 000 | 1395   | 231    | F1 00F4  | .,     | 200103                                 |
| 28       | 14.825 | 14.825   | 0.000 | 255514 | 59725  | 51.9854  |        | BZ#123                                 |
| 29       | 14.938 | 14.938   | 0.000 | 296947 | 56824  | 51.9206  |        | BZ#118                                 |
| 30       | 15.428 | 15.428   | 0.000 | 345115 | 75046  | 49.0166  | М      | BZ#114                                 |
|          | 15.736 | 15 003   | 0 000 | 9857   | 1588   | 105 445  |        | 7745                                   |
| 31       | 15.993 | 15.993   | 0.000 | 554603 | 90887  |          | М      | BZ#153                                 |
| 31<br>32 | 15.993 | 15.993   | 0.000 | 554603 | 90887  | 107.445  |        | BZ#184                                 |
|          | 16.155 | 16.155   | 0.000 | 342681 | 65716  | 49.1628  |        | BZ#105                                 |
| 33       | 17.328 | 17.328   | 0.000 | 336653 | 70198  | 52.2820  | М      | BZ#138                                 |
| 34       | 17.762 | 17.762   | 0.000 | 213845 | 33598  | 50.6354  |        | BZ#126                                 |
| 35       | 18.170 | 18.170   | 0.000 | 317650 | 64933  | 53.7771  |        | BZ#187                                 |
| 36       | 18.416 | 18.416   | 0.000 | 334851 | 70353  | 53.1696  |        | BZ#183                                 |
| 37       | 18.647 | 18.647   | 0.000 | 350353 | 77683  | 52.3410  |        | BZ#128                                 |
| 38       | 18.760 | 18.760   | 0.000 | 332778 | 60027  | 52.3114  |        | BZ#167                                 |
| 39       | 19.886 | 19.886   | 0.000 | 338088 | 66753  | 49.3164  |        | BZ#156                                 |
| 40       | 20.174 | 20.174   | 0.000 | 357199 | 68103  | 50.6801  |        | BZ#157                                 |
| 41       | 20.537 | 20 727   | 0 000 | 6410   | 1005   | E0       |        |                                        |
| 42       | 20.781 | 20.781   | 0.000 | 369555 | 74182  | 52.5402  | 7.     | BZ#180                                 |
| 43       | 21.854 | 21.854   | 0.000 | 293660 | 46713  | 51.3515  |        | BZ#169                                 |
| 44       | 22.271 | 22.271   | 0.000 | 389489 | 77513  | 52.3213  | _      | BZ#170                                 |
| \$ 45    | 22.559 | 22.559   | 0.000 | 399373 | 78261  | 52.7934  | R      | BZ#198                                 |
| 46       | 23.005 |          |       | 6886   | 1034   |          |        |                                        |
| 47       | 23.226 |          |       | 1271   | 184    |          |        |                                        |
| 48       | 23.820 | 23.820   | 0.000 | 380308 | 70565  | 51.3961  |        | BZ#189                                 |
| 49       | 24.552 | 24.552   | 0.000 | 420847 | 83155  | 53.2828  |        | BZ#195                                 |
| 50       | 24.909 |          |       | 2900   | 444    |          |        |                                        |
| 51       | 25.685 |          |       | 4449   | 864    |          |        |                                        |
| 52       | 27.655 | 27.655   | 0.000 | 425323 | 76390  | 53.1700  |        | BZ#206                                 |
| 53       | 29.180 | 29.180   | 0.000 | 387176 | 85234  | 255 5036 | М      | BZ#209                                 |

| Peak Peak Expected Delta Conc.       |                     |
|--------------------------------------|---------------------|
| No. RT RT RT Area Height (ppb) Flags | Peak Identification |
|                                      |                     |
| 54 31.151 388 87                     |                     |
| 55 31.592 786 237                    |                     |
| 56 31.685 1386 293                   | •                   |
| 57 32.020 3897 368                   |                     |
| 58 32.459 4126 561                   |                     |
| 59 32.585 4379 638                   |                     |
| 60 34.383 1653 321                   |                     |

Flags: A - Peak quantitates above calibration range

- a Peak quantitates below reporting limit
- H User selected alternate compound hit
- M Peak manually integrated or manually identified
- R Peak fails recovery
  U User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

| m      | Compounds  |
|--------|------------|
| Tarder | LOMBOILBUS |
|        |            |

| Peak    | Expected | manual Garage           |
|---------|----------|-------------------------|
| RT      | RT       | Target Compound         |
| ======= |          |                         |
| 5.001   | 5.001    | Tetrachloro-meta-xylene |
| 5.761   | 5.761    | B2#8                    |
| 6.701   | 6.701    | BZ#18                   |
| 7.925   | 7.925    | BZ#28                   |
| 8.984   | 8.984    | BZ#52                   |
| 9.122   | 9.122    | BZ#49                   |
| 9.667   | 9.667    | BZ#44                   |
| 11.243  | 11.243   | BZ#66                   |
| 12.207  | 12.207   | BZ#101                  |
| 13.318  | 13.318   | BZ#87                   |
| 13.318  | 13.318   | BZ#81                   |
| 13.752  | 13.752   | BZ#77                   |
| 14.825  | 14.825   | BZ#123                  |
| 14.938  | 14.938   | BZ#118                  |
| 15.428  | 15.428   | BZ#114                  |
| 15.993  | 15.993   | BZ#153                  |
| 15.993  | 15.993   | BZ#184 .                |
| 16.155  | 16.155   | BZ#105                  |
| 17.328  | 17.328   | BZ#138                  |
| 17.762  | 17.762   | BZ#126                  |
| 18.170  | 18.170   | BZ#187                  |
| 18.416  | 18.416   | BZ#183                  |
| 18.647  | 18.647   | BZ#128                  |
| 18.760  | 18.760   | BZ#167                  |
| 19.886  | 19.886   | BZ#156                  |
| 20.174  | 20.174   | BZ#157                  |
| 20.781  | 20.781   | BZ#180                  |
| 21.854  | 21.854   | BZ#169                  |
| 22.271  | 22.271   | B2#170                  |
| 22.559  | 22.559   | BZ#198                  |
| 23.820  | 23.820   | BZ#189                  |
| 24.552  | 24.552   | BZ#195                  |
| 27.655  | 27.655   | BZ#206                  |
| 29.180  | 29.180   | BZ#209                  |
|         |          |                         |

Column

3327\_1.i RTX-5

Injection Date
Dilution Factor
Data File

1.00

CALIB\_4 03-OCT-2002

20:55

Sample Type

Analyst Instrument

Matrix

WATER

Lab

Sample

IJ:

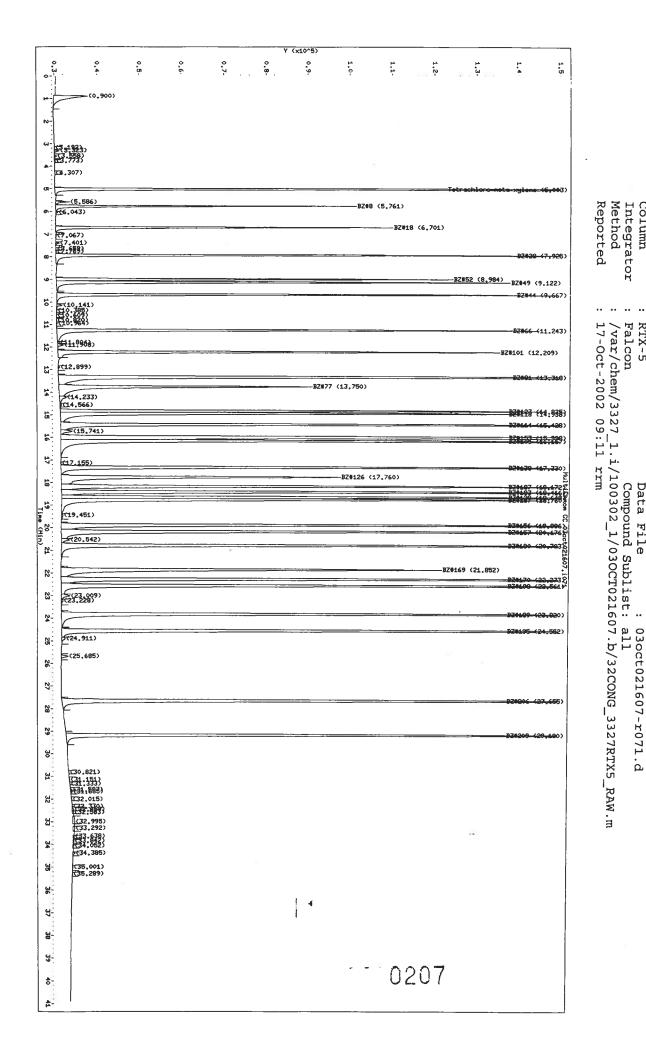
32CONG-L4

Client

Sample

Ħ:

32CONG-L4



Lab Sample ID: 32CONG-L4 Client Sample ID: 32CONG-L4

Matrix : WATER
Analyst : 
Instrument : 3327\_1.i Sample Type : CALIB\_4

Injection Date : 03-OCT-2002 20:55

Dilution Factor: 1.00

: RTX-5 Column Data File : 03oct021607-r071.d

Integrator : Falcon Compound Sublist: all

Method : /var/chem/3327\_1.i/100302\_1/03OCT021607.b/32CONG\_3327RTX5\_RAW.m Reported : 17-Oct-2002 09:11 rrm

Peaks

| Peak<br>No. | Peak<br>RT       | Expected<br>RT   | Delta<br>RT    | 3                  | uoi-b-           | Extract<br>Conc.   | E1      | Donk Idontification     |
|-------------|------------------|------------------|----------------|--------------------|------------------|--------------------|---------|-------------------------|
| NO.         | K1               | K1               | K1             | Area<br>======     | Height           | (ppb)              | Flags   | Peak Identification     |
| 1           | 0.900            |                  |                | 67589              | 7976             |                    |         |                         |
| 2           | 3.192            |                  |                | 227                | 65               |                    |         |                         |
| 3           | 3.323            |                  |                | 3993               | 1194             |                    |         |                         |
| 4           | 3.558            |                  |                | 1758               | 553              |                    |         |                         |
| 5           | 3.773            |                  |                | 76 <b>7</b>        | 269              |                    |         |                         |
| 6           | 4.307            |                  |                | 293                | 73               |                    |         |                         |
| 7           | 5.003            | 5.001            | 0.002          | 848262             | 321637           | 101.900            | R       | Tetrachloro-meta-xylene |
| 8           | 5.586            |                  |                | 10284              | 3227             |                    |         |                         |
| 9           | 5.761            | 5.761            | 0.000          | 210442             | 71253            | 102.342            | 12. 12. | BZ#8                    |
| 10          | 6.043            |                  |                | 2120               | 536              |                    |         |                         |
| 11          | 6.701            | 6.701            | 0.000          | 252278             | 79801            | 102.650            |         | BZ#18                   |
| 12          | 7.067            |                  |                | 992                | 143              |                    |         |                         |
| 13          | 7.401            |                  |                | 2673               | 886              |                    |         |                         |
| 14          | 7.659            |                  |                | 392                | 137              |                    |         |                         |
| 15<br>16    | 7.769<br>7.925   | 7.925            | 0 000          | 579                | 175              | 101 250            |         | 22420                   |
| 17          | 8.984            | 8.984            | 0.000          | 433100<br>330098   | 133381<br>93848  | 101.258<br>102.382 |         | BZ#28<br>BZ#52          |
| 18          | 9.122            | 9.122            | 0.000          | 401944             | 107569           | 101.847            |         | BZ#49                   |
| 19          | 9.667            | 9.667            | 0.000          | 440192             | 119217           | 102.051            |         | BZ#44                   |
| 20          | 10.141           | 3.007            | 0.000          | 5727               | 1346             | 102.031            |         | DU#11                   |
| 21          | 10.385           |                  |                | 333                | 98               |                    |         |                         |
| 22          | 10.609           |                  |                | 282                | 77               |                    |         |                         |
| 23          | 10.820           |                  |                | 391                | 102              |                    |         |                         |
| 24          | 10.964           |                  |                | 1022               | 257              |                    |         |                         |
| 25          | 11.243           | 11.243           | 0.000          | 477317             | 114505           | 100.460.           | M       | BZ#66                   |
| 26          | 11.804           |                  |                | 1744               | 370              |                    |         |                         |
| 27          | 11.908           |                  |                | 5873               | 1286             |                    |         |                         |
| 28          | 12.209           | 12.207           | 0.002          | 446512             | 104848           | 101.771            |         | BZ#101                  |
| 29          | 12.899           |                  |                | 1826               | 408              |                    |         |                         |
| 30          | 13.318           | 13.318           | 0.000          | 951531             | 206589           | 202.954            | М       | BZ#81                   |
| 30          | 13.318           | 13.318           | 0.000          | 951531             | 206589           | 202.954            | M       | BZ#87                   |
| 31          | 13.750           | 13.752           | -0.002         | 347923             | 60062            | 99.5757            | М       | BZ#77                   |
| 32          | 14.233           |                  |                | 13397              | 1550             |                    |         |                         |
| 33          | 14.566           |                  |                | 2376               | 431              |                    |         |                         |
| 34          | 14.825           | 14.825           | 0.000          | 494558             | 115477           | 100.220            |         | BZ#123                  |
| 35          | 14.938           | 14.938           | 0.000          | 547802             | 109542           | 100.113            |         | BZ#118                  |
| 36          | 15.428           | 15.428           | 0.000          | 688190             | 155557           | 99.8021            | М       | BZ#114                  |
| 37<br>38    | 15.741<br>15.998 | 15 003           | 0.004          | 16068              | 2691             | 203.746            | M       | D7#153                  |
| 38          | 15.998           | 15.993<br>15.993 | 0.004<br>0.004 | 1018555<br>1018555 | 169588           | 203.746            |         | BZ#153<br>BZ#184        |
| 39          | 16.157           | 16.155           | 0.004          | 673461             | 169588<br>134702 | 98.8982            |         | BZ#104<br>BZ#105        |
| 40          | 17.155           | 10.133           | 0.002          | 614                | 134702           | 90.0702            | 14      | B2#103                  |
| 41          | 17.133           | 17.328           | 0.002          | 636842             | 135647           | 101.730            | М       | BZ#138                  |
| 42          | 17.760           | 17.762           | -0.002         | 399109             | 66395            | 98.4409            |         | BZ#136                  |
| 43          | 18.172           | 18.170           | 0.002          | 584866             | 120830           | 101.985            |         | BZ#187                  |
| 44          | 18.416           | 18.416           | 0.000          | 631644             | 130881           | 100.142            |         | BZ#183                  |
| 45          | 18.649           | 18.647           | 0.002          | 686546             | 150261           | 101.337            |         | BZ#128                  |
| 46          | 18.760           | 18.760           | 0.000          | 622875             | 115129           | 100.811            |         | BZ#167                  |
| 47          | 19.451           |                  |                | 3658               | 357              |                    |         |                         |
| 48          | 19.886           | 19.886           | 0.000          | 669390             | 135185           | 98.4397            |         | BZ#156                  |
| 49          | 20.176           |                  | 0.002          | 694453             | 134104           | 98.8814            |         | BZ#157                  |
| 50          | 20.542           |                  |                | 11909              | 1872             |                    |         |                         |
| 51          | 20.783           | 20.781           | 0.002          | 704657             | 140107           | 100.034            |         | BZ#180                  |
| 52          | 21.852           | 21.854           | -0.002         | 546885             |                  | $02^{10}8^{2}$     |         | BZ#169                  |
| 53          | 22.273           | 22.271           | 0.002          | 751388             | 149808           | 1101 X676          |         | BZ#170                  |

|    |      |        |          |       |         |        | Extract  |       |                                         |
|----|------|--------|----------|-------|---------|--------|----------|-------|-----------------------------------------|
| P  | eak  | Peak   | Expected | Delta |         |        | Conc.    |       |                                         |
|    | No.  | RT     | RT       | RT    | Area    | Height | (ppb)    | Flags | Peak Identification                     |
| =  | ==== | ====== | =======  |       | ======= |        | ======== |       | ======================================= |
| \$ | 54   | 22.561 | 22.559   | 0.002 | 758899  | 149386 | 102.276  | R     | BZ#198                                  |
|    | 55   | 23.009 |          |       | 13115   | 1971   |          |       |                                         |
|    | 56   | 23.228 |          |       | 2780    | 368    |          |       | _                                       |
|    | 57   | 23.820 | 23.820   | 0.000 | 733534  | 136042 | 99.2622  |       | BZ#189                                  |
|    | 58   | 24.552 | 24.552   | 0.000 | 804526  | 156012 | 101.106  |       | BZ#195                                  |
|    | 59   | 24.911 |          |       | 5997    | 838    |          |       |                                         |
|    | 60   | 25.685 |          |       | 8224    | 1653   |          |       |                                         |
|    | 61   | 27.655 | 27.655   | 0.000 | 801003  | 142431 | 101.066  |       | BZ#206                                  |
|    | 62   | 29.180 | 29.180   | 0.000 | 716160  | 152724 | 102.172  | M     | BZ#209                                  |
|    | 63   | 30.821 |          |       | 438     | 115    |          |       |                                         |
|    | 64   | 31.151 |          |       | 797     | 148    |          |       |                                         |
|    | 65   | 31.333 |          |       | 365     | 111    |          |       |                                         |
|    | 66   | 31.587 |          |       | 1253    | 406    |          |       |                                         |
|    | 67   | 31.685 |          |       | 1415    | 415    |          |       |                                         |
|    | 68   | 32.015 |          |       | 603     | 177    |          |       |                                         |
|    | 69   | 32.330 |          |       | 452     | 109    |          |       |                                         |
|    | 70   | 32.459 |          |       | 2260    | 429    |          |       |                                         |
|    | 71   | 32.583 |          |       | 2413    | 355    |          |       |                                         |
|    | 72   | 32.995 |          |       | 8414    | 536    |          |       |                                         |
|    | 73   | 33.292 |          |       | 4865    | 456    |          |       |                                         |
|    | 74   | 33.638 |          |       | 2109    | 333    |          |       |                                         |
|    | 75   | 33.842 |          |       | 1954    | 271    |          |       |                                         |
|    | 76   | 34.052 |          |       | 1473    | 238    |          |       |                                         |
|    | 77   | 34.385 |          |       | 2450    | 555    | •        | n = 8 |                                         |
|    | 78   | 35.001 |          |       | 752     | 132    |          |       |                                         |
|    | 79   | 35.289 |          |       | 354     | 80     |          |       |                                         |
|    |      |        |          |       |         |        |          |       |                                         |

Flags: A - Peak quantitates above calibration range

U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

| Target Compou | ınds |
|---------------|------|
|---------------|------|

| Peak   | Expected |                         |
|--------|----------|-------------------------|
| RT     | RT       | Target Compound         |
| ====== |          |                         |
| 5.003  | 5.001    | Tetrachloro-meta-xylene |
| 5.761  | 5.761    | BZ#8                    |
| 6.701  | 6.701    | BZ#18                   |
| 7.925  | 7.925    | BZ#28                   |
| 8.984  | 8.984    | BZ#52                   |
| 9.122  | 9.122    | BZ#49                   |
| 9.667  | 9.667    | BZ#44                   |
| 11.243 | 11.243   | BZ#66                   |
| 12.209 | 12.207   | BZ#101                  |
| 13.318 | 13.318   | BZ#87                   |
| 13.318 | 13.318   | BZ#81                   |
| 13.750 | 13.752   | BZ#77                   |
| 14.825 | 14.825   | BZ#123                  |
| 14.938 | 14.938   | BZ#118                  |
| 15.428 | 15.428   | BZ#114                  |
| 15.998 | 15.993   | BZ#153                  |
| 15.998 | 15.993   | BZ#184                  |
| 16.157 | 16.155   | BZ#105                  |
| 17.330 | 17.328   | BZ#138                  |
| 17.760 | 17.762   | BZ#126                  |
| 18.172 | 18.170   | BZ#187                  |
| 18.416 | 18.416   | BZ#183                  |
| 18.649 | 18.647   | BZ#128                  |
| 18.760 | 18.760   | BZ#167                  |
| 19.886 | 19.886   | BZ#156                  |
| 20.176 | 20.174   | BZ#157                  |
| 20.783 | 20.781   | BZ#180                  |
| 21.852 | 21.854   | BZ#169                  |
| 22.273 | 22.271   | BZ#170 0209             |

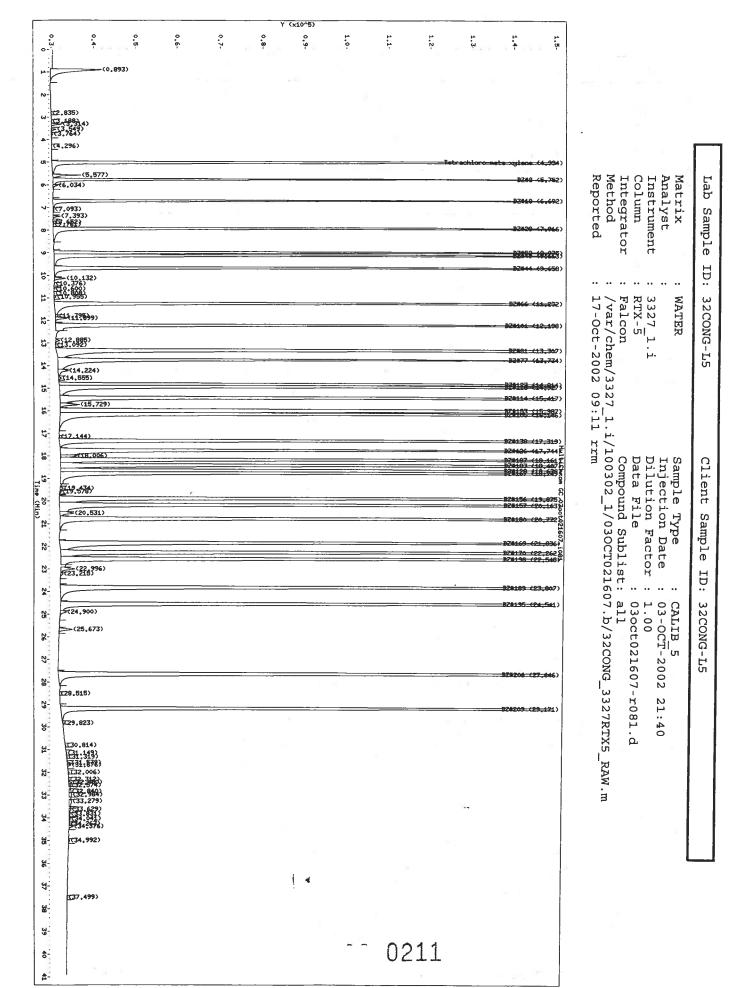
a - Peak quantitates below reporting limit

H - User selected alternate compound hit

M - Peak manually integrated or manually identified R - Peak fails recovery

STL Burlington - Target GC Injection Report

| Peak   | Expected |                 |
|--------|----------|-----------------|
| RT     | RT       | Target Compound |
|        |          |                 |
| 22.561 | 22.559   | BZ#198          |
| 23.820 | 23.820   | BZ#189          |
| 24.552 | 24.552   | BZ#195          |
| 27.655 | 27.655   | BZ#206          |
| 29.180 | 29.180   | BZ#209          |



Lab Sample ID: 32CONG-L5 Client Sample ID: 32CONG-L5

Matrix : WATER Sample Type : CALIB 5

Injection Date : 03-OCT-2002 21:40 Analyst

: 3327\_1.i Dilution Factor: 1.00 Instrument

: 03oct021607-r081.d : RTX-5 Data File Column

Compound Sublist: all Integrator : Falcon

: /var/chem/3327 1.i/100302 1/03OCT021607.b/32CONG\_3327RTX5\_RAW.m Method

Peaks

: 17-Oct-2002 09:11 rrm Reported

|          |                  |                  | _                |                    |                  | Extract            |         |                                         |  |
|----------|------------------|------------------|------------------|--------------------|------------------|--------------------|---------|-----------------------------------------|--|
| Peak     | Peak             | Expected         | Delta            |                    |                  | Conc.              |         |                                         |  |
| No.      | RT               | RT               | RT               | Area               | Height           | (ppb)              | Flags   | Peak Identifica                         |  |
| 1        | 0.893            | ======           |                  | 96110              | 12054            | =======            |         | *************************************** |  |
| . 2      | 2.835            |                  |                  | 195                | 52               |                    |         |                                         |  |
| 3        | 3.188            |                  |                  | 437                | 129              |                    |         |                                         |  |
| 4        | 3.314            |                  |                  | 7913               | 2383             |                    |         |                                         |  |
| 5        | 3.549            |                  |                  | 3624               | 1111             |                    |         |                                         |  |
| 6        | 3.764            |                  |                  | 1490               | 394              |                    |         |                                         |  |
| 7        | 4.296            |                  |                  | 676                | 100              |                    |         |                                         |  |
| 8        | 4.994            | 5.001            | -0.007           | 1674721            | 615745           | 194.976            | MR      | Tetrachloro-meta-xylene                 |  |
| 9        | 5.577            |                  |                  | 21503              | 6613             | •                  | 8. 7    |                                         |  |
| 10       | 5.752            | 5.761            | -0.009           | 395190             | 133093           | 192.938            | M       | BZ#8                                    |  |
| 11       | 6.034            |                  |                  | 4857               | 1075             |                    |         |                                         |  |
| 12       | 6.692            | 6.701            | -0.009           | 465566             | 146005           | 190.494            |         | BZ#18                                   |  |
| 13       | 7.093            |                  |                  | 2188               | 257              |                    |         |                                         |  |
| 14       | 7.393            |                  |                  | 5229               | 1736             |                    |         |                                         |  |
| 15       | 7.652            |                  |                  | 859                | 290              |                    |         |                                         |  |
| 16       | 7.761            |                  |                  | 475                | 146              |                    |         |                                         |  |
| 17       | 7.916            | 7.925            | -0.009           | 860993             | 261113           | 198.099            |         | BZ#28                                   |  |
| 18       | 8.975            | 8.984            | -0.009           | 608347             | 172909           | 191.097            |         | BZ#52                                   |  |
| 19       | 9.113            | 9.122            | -0.009           | 751011             | 200601           | -192.075           |         | BZ#49                                   |  |
| 20       | 9.658            | 9.667            | -0.009           | 829777             | 223407           | 192.919            |         | BZ#44                                   |  |
| 21       | 10.132           |                  |                  | 10803              | 2663             |                    |         |                                         |  |
| 22       | 10.376           |                  |                  | 683                | 201              |                    |         |                                         |  |
| 23       | 10.600           |                  |                  | 611                | 164              |                    |         |                                         |  |
| 24       | 10.808           |                  |                  | 735                | 198              |                    |         |                                         |  |
| 25       | 10.955           |                  |                  | 2105               | 542              |                    |         |                                         |  |
| 26       | 11.232           | 11.243           | -0.011           | 932875             | 228856           | 199.914            | M       | BZ#66                                   |  |
| 27       | 11.795           |                  |                  | 3151               | 664              |                    |         |                                         |  |
| 28       | 11.899           |                  |                  | 12071              | 2676             |                    |         |                                         |  |
| 29       | 12.198           | 12.207           | -0.009           | 837124             | 196433           | 192.535            | М       | BZ#101                                  |  |
| 30       | 12.885           |                  |                  | 3906               | 912              |                    |         |                                         |  |
| 31       | 13.092           |                  |                  | 361                | 96               | 200 200            |         | PG#03                                   |  |
| 32       | 13.307           | 13.318           | -0.011           | 1811812            | 397093           | 390.307            |         | BZ#81                                   |  |
| 32       | 13.307           | 13.318           | -0.011           | 1811812            | 397093           | 390.307            |         | BZ#87                                   |  |
| 33       | 13.734           | 13.752           | -0.018           | 641222             | 122197           | 200.320            | MA      | BZ#77                                   |  |
| 34       | 14.224           |                  |                  | 17216              | 2402             |                    |         |                                         |  |
| 35       | 14.555           |                  |                  | 3312               | 713              | 107 700            | .,      | DZ#122                                  |  |
| 36       | 14.814           | 14.825           | -0.011           | 958440             | 228158           | 197.709            |         | BZ#123<br>BZ#118                        |  |
| 37       | 14.927           | 14.938           | -0.011           | 1050163<br>1392288 | 216245<br>318063 | 197.657<br>202.309 | M<br>AM | BZ#114                                  |  |
| 38       | 15.417           | 15.428           | -0.011           |                    | 4649             | 202.309            | Alvi    | 82#114                                  |  |
| 39       | 15.729           | 15 003           | 0 007            | 24000<br>1913772   | 318510           | 385.972            | м       | BZ#153                                  |  |
| 40       | 15.987           | 15.993           | -0.007<br>-0.007 |                    |                  | 385.972            |         | BZ#184                                  |  |
| 40       | 15.987           | 15.993           | -0.007           | 1913772<br>1330209 | 318510<br>279070 | 202.980            | A       | BZ#105                                  |  |
| 41       | 16.146           | 16.155           | -0.009           | 672                | 2/30/0           | 202.960            |         | 82#103                                  |  |
| 42       | 17.144           | 17 330           | 0 000            |                    |                  | 105 260            | м       | BZ#138                                  |  |
| 43       | 17.319           | 17.328           | -0.009<br>-0.018 | 1223066<br>739670  | 259588<br>137164 | 195.368<br>201.595 |         | BZ#136<br>BZ#126                        |  |
| 44       | 17.744           | 17.762           | -0.018           | 19621              | 3865             | 201.333            | ru-i    | 204160                                  |  |
| 45       | 18.006           | 10 170           | -0.008           | 1101956            | 226089           | 192.765            | м       | BZ#187                                  |  |
| 46       | 18.161           | 18.170<br>18.416 | -0.009<br>-0.009 | 1211699            | 254098           | 195.762            |         | BZ#187<br>BZ#183                        |  |
| 47       | 18.407           |                  | -0.009           | 1339181            | 290932           | 196.301            | 1-1     | BZ#103<br>BZ#128                        |  |
| 48       | 18.638           | 18.647<br>18.760 | -0.009           | 1168127            | 223579           | 196.266            |         | BZ#120<br>BZ#167                        |  |
| 49       | 18.749           | 18.760           | -0.011           | 4683               | 756              | 190.200            |         | DON 10 /                                |  |
| 50<br>51 | 19.434           |                  |                  | 1791               | - 394            |                    |         |                                         |  |
| 51<br>52 | 19.578<br>19.875 | 19.886           | -0.011           | 1357359            | 281-219          | C C243 A69         | A       | BZ#156                                  |  |
| 22       | 20.163           | 20.174           | -0.011           | 1369760            | 274322           |                    |         | BZ#157                                  |  |

STL Burlington - Target GC Injection Report

|    |      |         |          |        |         |         | Extract   |       |                                         |
|----|------|---------|----------|--------|---------|---------|-----------|-------|-----------------------------------------|
| E  | eak  | Peak    | Expected | Delta  |         |         | Conc.     |       |                                         |
|    | No.  | RT      | RT       | RT     | Area    | Height  | (ppb)     | Flags | Peak Identification                     |
| =  | ==== | ======= |          |        |         | ======= | ========= | ===== | ======================================= |
|    | 54   | 20.531  |          |        | 20359   | 3349    |           |       |                                         |
|    | 55   | 20.772  | 20.781   | -0.009 | 1360655 | 274674  | 196.980   | M     | BZ#180                                  |
|    | 56   | 21.836  | 21.854   | -0.018 | 1039118 | 180982  | 198.798   | M     | BZ#169                                  |
|    | 57   | 22.262  | 22.271   | -0.009 | 1454206 | 287305  | 195.543   | M     | BZ#170                                  |
| \$ | 58   | 22.548  | 22.559   | -0.011 | 1449033 | 281488  | 194.182   | MR    | BZ#198                                  |
|    | 59   | 22.996  |          |        | 20735   | 3408    |           |       |                                         |
|    | 60   | 23.215  |          |        | 3852    | 574     |           |       |                                         |
|    | 61   | 23.807  | 23.820   | -0.013 | 1431078 | 272731  | 199.187   | M     | BZ#189                                  |
|    | 62   | 24.541  | 24.552   | -0.011 | 1543499 | 299152  | 195.063   | M     | BZ#195                                  |
|    | 63   | 24.900  |          |        | 10692   | 1510    |           |       |                                         |
|    | 64   | 25.673  |          |        | 15993   | 3172    |           |       |                                         |
|    | 65   | 27.646  | 27.655   | -0.009 | 1521519 | 271038  | 194.337   |       | BZ#206                                  |
|    | 66   | 28.515  |          |        | 319     | 76      |           |       |                                         |
|    | 67   | 29.171  | 29.180   | -0.009 | 1332724 | 280082  | 190.238   | M     | BZ#209                                  |
|    | 68   | 29.823  |          |        | 1337    | 178     |           |       |                                         |
|    | 69   | 30.814  |          |        | 786     | 221     |           |       |                                         |
|    | 70   | 31.149  |          |        | 1291    | 191     |           |       |                                         |
|    | 71   | 31.319  |          |        | 935     | 262     |           |       |                                         |
|    | 72   | 31.579  |          |        | 2572    | 798     |           |       |                                         |
|    | 73   | 31.676  |          |        | 3249    | 850     |           |       |                                         |
|    | 74   | 32.006  |          |        | 1280    | 351     |           |       |                                         |
|    | 75   | 32.312  |          |        | 663     | 149     |           |       |                                         |
|    | 76   | 32.450  |          |        | 3000    | 696     |           |       |                                         |
|    | 77   | 32.574  |          |        | 2111    | 342     |           |       |                                         |
|    | 78   | 32.840  |          |        | 4306    | 487     |           |       |                                         |
|    | 79   | 32.984  |          |        | 6041    | 667     |           |       |                                         |
|    | 80   | 33.279  |          |        | 8047    | 598     |           |       |                                         |
|    | 81   | 33.629  |          |        | 2982    | 408     |           |       |                                         |
|    | 82   | 33.831  |          |        | 1645    | 221     |           |       |                                         |
|    | 83   | 34.041  |          |        | 1465    | 295     |           |       |                                         |
|    | 84   | 34.263  |          |        | 603     | 152     |           |       |                                         |
|    | 85   | 34.376  |          |        | 3900    | 1000    |           |       |                                         |
|    | 86   | 34.992  |          |        | 1559    | 288     |           |       |                                         |
|    | 87   | 37.499  |          |        | 517     | 102     |           |       |                                         |
|    |      |         |          |        |         |         |           |       |                                         |

Flags: A - Peak quantitates above calibration range a - Peak quantitates below reporting limit

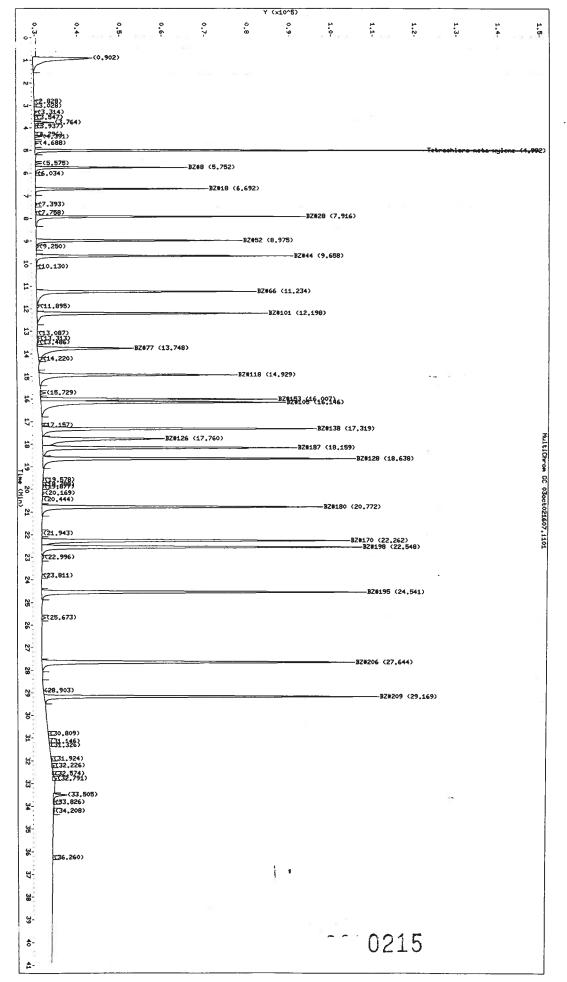
- H User selected alternate compound hit
- M Peak manually integrated or manually identified
- R Peak fails recovery
- U User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

### Target Compounds

| Peak   | Expected       |                                         |
|--------|----------------|-----------------------------------------|
| RT     | RT             | Target Compound                         |
|        | =======        | ======================================= |
| 4.994  | 5.001          | Tetrachloro-meta-xylene                 |
| 5.752  | 5.761          | BZ#8                                    |
| 6.692  | 6.701          | BZ#18                                   |
| 7.916  | 7.925          | BZ#28                                   |
| 8.975  | 8.984          | BZ#52                                   |
| 9.113  | 9.122          | BZ#49                                   |
| 9.658  | 9.667          | BZ#44                                   |
| 11.232 | 11.243         | BZ#66                                   |
| 12.198 | 12.207         | BZ#101                                  |
| 13.307 | 13.318         | BZ#87                                   |
| 13.307 | 13.318         | BZ#81                                   |
| 13.734 | 13.752         | BZ#77                                   |
| 14.814 | 14.825         | BZ#123                                  |
| 14.927 | 14.938         | BZ#118                                  |
| 15.417 | 15.428         | BZ#114                                  |
| 15.987 | <b>i</b> 5.993 | BZ#153                                  |
| 15.987 | 15.993         | BZ#184                                  |
| 16.146 | 16.155         | BZ#105                                  |
| 17.319 | 17.328         | BZ#138                                  |
| 17.744 | 17.762         | BZ#126 0 0 4 0                          |
| 18.161 | 18.170         | BZ#187 0213                             |

STL Burlington - Target GC Injection Report

| Peak   | Expected | Towns Communi   |
|--------|----------|-----------------|
| RT     | RT       | Target Compound |
|        |          |                 |
| 18.407 | 18.416   | BZ#183          |
| 18.638 | 18.647   | BZ#128          |
| 18.749 | 18.760   | BZ#167          |
| 19.875 | 19.886   | BZ#156          |
| 20.163 | 20.174   | BZ#157          |
| 20.772 | 20.781   | BZ#180          |
| 21.836 | 21.854   | BZ#169          |
| 22.262 | 22.271   | BZ#170          |
| 22.548 | 22.559   | BZ#198          |
| 23.807 | 23.820   | BZ#189          |
| 24.541 | 24.552   | BZ#195          |
| 27.646 | 27.655   | BZ#206          |
| 29.171 | 29.180   | BZ#209          |



| Method<br>Reported                                                                       | Integrator              | Column                         | Instrument             | Analyst                            | Matrix                 | Lab Sample ID: 20ICV-50    |
|------------------------------------------------------------------------------------------|-------------------------|--------------------------------|------------------------|------------------------------------|------------------------|----------------------------|
| : /var/chem/3327_1.i/100<br>: 17-Oct-2002 09:11 rrm                                      | : Falcon                | : RTX-5                        | : 3327 <u>1.i</u>      | ••                                 | : WATER                | 0: 20ICV-50                |
| /var/chem/3327_1.i/100302_1/03OCT021607.b/32CONG_3327RTX5_RAW.m<br>17-Oct-2002 09:11 rrm | Compound Sublist: 20ICV | Data File : 03oct021607-r101.d | Dilution Factor : 1.00 | Injection Date : 03-OCT-2002 23:10 | Sample Type : CCALIB 6 | Client Sample ID: 20ICV-50 |

Lab Sample ID: 20ICV-50 Client Sample ID: 20ICV-50

: WATER Matrix

Sample Type : CCALIB\_6
Injection Date : 03-OCT-2002 23:10 Analyst 

Dilution Factor: 1.00

: RTX-5 Column Data File : 03oct021607-r101.d

Integrator : Falcon Compound Sublist: 20ICV

Method : /var/chem/3327\_1.i/100 Reported : 17-Oct-2002 09:11 rrm : /var/chem/3327\_1.i/100302\_1/03OCT021607.b/32CONG\_3327RTX5\_RAW.m

Peaks

| Pe  | eak      | Peak             | Expected         | Delta            |                  |                | Extract<br>Conc.   |       |                         |       |
|-----|----------|------------------|------------------|------------------|------------------|----------------|--------------------|-------|-------------------------|-------|
| N   | 10.      | RT               | RT               | RT               | Area             | Height         | (ppb)              | Flags | Peak Identification     |       |
| ==  | 1        | 0.902            | ======           |                  | 128097           | 14077          |                    |       |                         | ===== |
|     | 2        | 2.828            |                  |                  | 595              | 94             |                    |       |                         |       |
|     | 3        | 3.028            |                  |                  | 207              | 44             |                    |       |                         |       |
|     | 4        | 3.314            |                  |                  | 1947             | 565            |                    |       |                         |       |
|     | 5        | 3.547            |                  |                  | 765              | 256            |                    |       |                         |       |
|     | 6        | 3.764            |                  |                  | 12991            | 4557           |                    |       |                         |       |
|     | 7        | 3.937            |                  |                  | 739              | 231            |                    |       |                         |       |
|     | 8        | 4.296            |                  |                  | 629              | 118            |                    | 3 V   |                         |       |
|     | 9        | 4.391            |                  |                  | 4437             | 1631           | -                  |       |                         |       |
| ÷   | 10       | 4.688<br>4.992   | 5 001            | 0 000            | 2711             | 861            | 40 1000            |       | Material 2              |       |
| \$  | 11<br>12 | 5.575            | 5.001            | -0.009           | 392997<br>4898   | 155078<br>1582 | 49.1896            | ĸ     | Tetrachloro-meta-xylene |       |
|     | 13       | 5.752            | 5.761            | -0.009           | 109024           | 36019          | 50.7236            |       | BZ#8                    |       |
|     | 14       | 6.034            | 3.701            | 0.003            | 1242             | 287            | 30.7230            |       | 52#6                    |       |
|     | 15       | 6.692            | 6.701            | -0.009           | 130237           | 40866          | 50.9892            |       | BZ#18                   |       |
|     | 16       | 7.393            |                  |                  | 1257             | 419            |                    |       |                         |       |
|     | 17       | 7.758            |                  |                  | 1046             | 306            |                    |       |                         |       |
|     | 18       | 7.916            | 7.925            | -0.009           | 212998           | 63854          | 48.5462            |       | BZ#28                   |       |
|     | 19       | 8.975            | 8.984            | -0.009           | 178742           | 48789          | 51.8207            |       | BZ#52                   |       |
|     | 20       | 9.250            |                  |                  | 3328             | 535            |                    |       |                         |       |
|     | 21       | 9.658            | 9.667            | -0.009           | 226035           | 60817          | 51.1189            |       | BZ#44                   |       |
|     | 22       | 10.130           |                  |                  | 1082             | 211            |                    |       |                         |       |
|     | 23       | 11.234           | 11.243           | -0.009           | 243430           | 52036          | 46.1286            |       | BZ#66                   |       |
|     | 24<br>25 | 11.895<br>12.198 | 12.207           | 0.000            | 3512             | 578<br>54504   | E1 0670            |       | P7#101                  |       |
|     | 26       | 13.087           | 12.207           | -0.009           | 242507<br>512    | 54594<br>125   | 51.9678.           |       | BZ#101                  |       |
|     | 27       | 13.313           |                  |                  | 2147             | 511            |                    |       |                         |       |
|     | 28       | 13.486           |                  |                  | 1433             | 314            |                    |       |                         |       |
|     | 29       | 13.748           | 13.752           | -0.004           | 165043           | 22896          | 39.3158            |       | BZ#77                   |       |
|     | 30       | 14.220           |                  |                  | 5630             | 827            |                    |       |                         |       |
|     | 31       | 14.929           | 14.938           | -0.009           | 252553           | 47024          | 42.9618            |       | BZ#118                  |       |
|     | 32       | 15.729           |                  |                  | 5687             | 1283           |                    |       |                         |       |
|     | 33       | 16.007           | 15.993           | 0.013            | 258960           | 56198          | 64.9986            |       | BZ#153                  |       |
|     | 34       | 16.146           | 16.155           | -0.009           | 334813           | 58153          | 43.7103            | M     | BZ#105                  |       |
|     | 35       | 17.157           |                  |                  | 298              | 64             |                    |       |                         |       |
|     | 36       | 17.319           | 17.328           | -0.009<br>-0.002 | 322440           | 65260          | 48.5513            |       | BZ#138                  |       |
|     | 37<br>38 | 17.760<br>18.159 | 17.762<br>18.170 | -0.002           | 226244<br>311913 | 29042<br>60443 | 43.9945<br>49.9047 |       | BZ#126<br>BZ#187        |       |
|     | 39       | 18.638           | 18.647           | -0.009           | 374085           | 74491          | 50.1861            |       | BZ#107<br>BZ#128        |       |
|     | 40       | 19.578           |                  | 2.005            | 1704             | 291            | 55.1001            | ••    |                         |       |
|     | 41       | 19.788           |                  |                  | 1140             | 246            |                    |       |                         |       |
|     | 42       | 19.877           |                  |                  | 1376             | 260            |                    |       |                         |       |
|     | 43       | 20.169           |                  |                  | 3013             | 458            |                    |       |                         |       |
|     | 44       | 20.444           |                  |                  | 930              | 173            |                    | ••    |                         |       |
|     | 45       | 20.772           | 20.781           | -0.009           | 349615           | 66891          | 47.2876            | M     | BZ#180                  |       |
|     | 46       | 21.943           |                  |                  | 1311             | 146            |                    |       |                         |       |
| . 1 | 47       | 22.262           | 22.271           | -0.009           | 376653           | 73450          | 49.5476            | _     | BZ#170                  |       |
| \$  | 48       | 22.548           | 22.559           | -0.011           | 393195           | 76395          | 51.4952            | R     | BZ#198                  |       |
|     | 49       | 22.996           |                  |                  | 3256             | 449            |                    |       |                         |       |
|     | 50<br>51 | 23.811           | 24 552           | -0.013           | 1 558            | 112            | 40 6120            |       | P7#105                  |       |
|     | 52       | 24.541<br>25.673 | 24.552           | -0.011           | 401984<br>4837   | 77564<br>917   | 49.6128            |       | BZ#195                  |       |
|     | 53       | 27.644           | 27.655           | -0.011           | 418214           | 74869          | 52.0669            |       | BZ#206                  |       |
|     | 54       | 28.903           | _,,,,,,,         | 3.022            | 888              | 10             |                    |       |                         |       |
|     | 55       | 29.169           | 29.180           | -0.011           | 371696           | 80182          | )251.602           | М     | BZ#209                  |       |

|       |        |          |        |         |        | Extract |       |                     |
|-------|--------|----------|--------|---------|--------|---------|-------|---------------------|
| Peak  | Peak   | Expected | Delta  |         |        | Conc.   |       |                     |
| No.   | RT     | RT       | RT     | Area    | Height | (ppb)   | Flags | Peak Identification |
| ===== |        | ======   | ====== | ======= |        |         | ===== |                     |
| 56    | 30.809 |          |        | 702     | 206    |         |       |                     |
| 57    | 31.146 |          |        | 651     | 130    |         |       |                     |
| 58    | 31.326 |          |        | 194     | 52     |         |       |                     |
| 59    | 31.924 |          |        | 1633    | 436    |         |       | •                   |
| 60    | 32.226 |          |        | 2973    | 713    |         |       |                     |
| 61    | 32.574 |          |        | 2368    | 358    |         |       |                     |
| 62    | 32.791 |          |        | 6637    | 1066   |         |       |                     |
| 63    | 33.505 |          |        | 18506   | 3315   |         |       |                     |
| 64    | 33.826 |          |        | 2032    | 274    |         |       |                     |
| 65    | 34.208 |          |        | 3262    | 296    |         |       |                     |
| 66    | 36.260 |          |        | 486     | 102    |         |       |                     |

Flags: A - Peak quantitates above calibration range

a - Peak quantitates below reporting limit

H - User selected alternate compound hit
M - Peak manually integrated or manually identified

R - Peak fails recovery

U - User disabled peak ID: either peak quantitates below reporting limit or

peak identification not confirmed on second column

### Target Compounds

|         |          | • · · · · · · · · · · · · · · · · · · · |
|---------|----------|-----------------------------------------|
| Peak    | Expected |                                         |
| RT      | RT       | Target Compound                         |
| ======= | *****    | ======================================= |
| 4.992   | 5.001    | Tetrachloro-meta-xylene                 |
| 5.752   | 5.761    | BZ#8                                    |
| 6.692   | 6.701    | BZ#18                                   |
| 7.916   | 7.925    | BZ#28 ==                                |
| 8.975   | 8.984    | BZ#52                                   |
| 9.658   | 9.667    | BZ#44                                   |
| 11.234  | 11.243   | BZ#66                                   |
| 12.198  | 12.207   | BZ#101                                  |
| 13.748  | 13.752   | BZ#77                                   |
| 14.929  | 14.938   | BZ#118                                  |
| 16.007  | 15.993   | BZ#153                                  |
| 16.146  | 16.155   | BZ#105                                  |
| 17.319  | 17.328   | BZ#138                                  |
| 17.760  | 17.762   | BZ#126                                  |
| 18.159  | 18.170   | BZ#187                                  |
| 18.638  | 18.647   | BZ#128                                  |
| 20.772  | 20.781   | BZ#180                                  |
| 22.262  | 22.271   | BZ#170                                  |
| 22.548  | 22.559   | BZ#198                                  |
| 24.541  | 24.552   | BZ#195                                  |
| 27.644  | 27.655   | BZ#206                                  |
| 29.169  | 29.180   | BZ#209                                  |
|         |          |                                         |

Client Sample ID: 32CONG-L3

Lab Sample ID: 32CONG-L3

|                  | Y (x10^5)                                                                                            |                                                                                     |
|------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 0.3-             |                                                                                                      |                                                                                     |
| 1                | (0,894)                                                                                              |                                                                                     |
| N-               |                                                                                                      |                                                                                     |
| ω E              | 2.891)                                                                                               |                                                                                     |
| K                | (3, 307)<br>3, 542) 789)<br>3, 935y 789)                                                             |                                                                                     |
| 4 FATIN          | 74,682)                                                                                              |                                                                                     |
| 1 K              | (5, 287)                                                                                             | H D L O L D D                                                                       |
|                  | BZ#8 (5.746)<br>(6.025)                                                                              | Matrix<br>Analyst<br>Instrum<br>Column<br>Integra<br>Method<br>Reporte              |
| 7-12             | BZ#18 (6,683)                                                                                        | ly<br>tri<br>egg<br>hoo                                                             |
|                  | \$7.384\<br>\$7.752\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\                                               | Matrix Analyst Instrument Column Integrator Method Reported                         |
| 9-               | B.2852 (B <sub>2.266</sub> ) (9,104)                                                                 | nt                                                                                  |
|                  | BZ#49 (9,104)  BZ#44 (9,647)                                                                         |                                                                                     |
| 10-12            | <u>r(</u> 10,121)                                                                                    |                                                                                     |
| #- E             | B2#66 (11,225)                                                                                       | WATER 3327_1 RTX-5 Falcon /var/cl 17-Oct                                            |
| 15-              | #C11.888) #Z#101 (12.189)                                                                            | WATER 3327_ RTX-5 Falco /var/ 17-0c                                                 |
| <u>ن</u>         | 712,881)                                                                                             | tt-                                                                                 |
| 12-              | BZ#81 (13,300)                                                                                       | WATER 3327_1.i RTX-5 Falcon /var/chem/3 17-Oct-2002                                 |
| 15               | 长14,211)<br>长14,546)<br>                                                                             | /33                                                                                 |
| 190              | F(15,716)                                                                                            | 27                                                                                  |
| 16               | BZ#105 (16,137) BZ#153 (15,976)                                                                      | <br>44                                                                              |
| 17               | BZ#138 (17.308)                                                                                      | 7.<br>T.                                                                            |
| ₩-               | B28126 (17.742)  B28187 (18.150)  B28183 (18.334)  B28167 (18.740)  B28167 (18.740)  B28167 (18.740) | Sampl<br>Injec<br>Dilut<br>Data<br>Compo<br>/100302                                 |
| _15-             |                                                                                                      | Sampl<br>Injec<br>Dilut<br>Data<br>Compc<br>.00302                                  |
| 19 20 Time (Hin) | 119.445) C                                                                                           | Sample Tinjection Dilution Data Filo Compound 00302_1// m                           |
| Hin              | (20,513) BZ#180 (20,759)                                                                             | Sample Typ Injection Dilution F Data File Compound S 100302_1/03                    |
| 12-              | BZ#150 (21,830)                                                                                      | Type: .on Date: .n Factor: .le: .d Sublist: ./030CT02160                            |
| 22-              | BZ#170 (22,246)                                                                                      | pe<br>Date<br>Factor<br>Sublis<br>30CT02                                            |
| 23-              | \$(22,978)                                                                                           | or<br>021                                                                           |
| 2-               | BZ#189 (23,791)                                                                                      | 60                                                                                  |
| 28-              | #24.880> BZ#195 (24.523)                                                                             | CCA<br>04-<br>1.0<br>03c<br>03c<br>a11<br>8.b                                       |
| 26-              | <u>5</u> (25,656)                                                                                    | /3<br>Gt 000<br>LH                                                                  |
| 1 3              |                                                                                                      | 021<br>021<br>200                                                                   |
| 27               | 32#206 (27,626)                                                                                      | DNG<br>-60                                                                          |
| 28-              | <u>{</u>                                                                                             | 8 2<br>  3                                                                          |
| 29-              | BZ#209 (29,156)                                                                                      | 08:<br>r13                                                                          |
| <b>ფ</b> ₋       |                                                                                                      | CCALIB_3 04-OCT-2002 08:55 1.00 03oct021608-r131.d all 08.b/32CONG_3327RTX5         |
| 끏-               | <del>F31 - 3483</del>                                                                                | ALIB_3<br>-OCT-2002 08:55<br>00<br>oct021608-r131.d<br>1<br>o/32CONG_3327RTX5_RAW.m |
| 32               | F31:503)<br>#31:623)<br>(431:930)                                                                    | RA                                                                                  |
|                  |                                                                                                      | W. n                                                                                |
| ద-               | (33,496)                                                                                             | ಶ                                                                                   |
| ¥_               | (34,356)                                                                                             |                                                                                     |
| 성-               |                                                                                                      |                                                                                     |
| 36               |                                                                                                      |                                                                                     |
| <b>3</b> -       | 1 4                                                                                                  |                                                                                     |
|                  | ` '                                                                                                  |                                                                                     |
| 8-               |                                                                                                      |                                                                                     |
| 39.              | Ψ                                                                                                    |                                                                                     |
| 8-               | ^ 0218                                                                                               |                                                                                     |
|                  |                                                                                                      |                                                                                     |
|                  |                                                                                                      |                                                                                     |

Y (x10^5)

Lab Sample ID: 32CONG-L3 Client Sample ID: 32CONG-L3

Matrix : WATER Sample Type : CCALIB 3

Analyst Injection Date : 04-OCT-2002 08:55 Analyst : 1.i

Dilution Factor: 1.00

Column : RTX-5 Data File : 03oct021608-r131.d

Integrator : Falcon Compound Sublist: all

Method : /var/chem/3327\_1.i/100302\_1/030CT021608.b/32CONG\_3327RTX5\_RAW.m Reported : 17-Oct-2002 09:44 rrm

|     |        |          |        |        |        | English          |       |                                         |
|-----|--------|----------|--------|--------|--------|------------------|-------|-----------------------------------------|
| eak | Peak   | Expected | Delta  |        |        | Extract<br>Conc. |       |                                         |
| No. | RT     | RT       | RT     | Area   | Height | (ppb)            | Flags | Peak Identification                     |
| 1   | 0.884  | ======   |        | 57204  | 6938   |                  | ===== | ======================================= |
| 2   | 2.891  |          |        | 257    | 83     |                  |       |                                         |
| 3   | 3.307  |          |        | 2099   | 598    |                  |       |                                         |
| 4   | 3.542  |          |        | 927    | 279    |                  |       |                                         |
| 5   | 3.759  |          |        | 12358  | 4342   |                  |       |                                         |
| 6   | 3.935  |          |        | 664    | 201    |                  |       |                                         |
| 7   | 4.294  |          |        | 538    | 111    |                  |       |                                         |
| 8   | 4.385  |          |        | 6480   | 2445   |                  |       |                                         |
| 9   | 4.682  |          |        | 2954   | 889    | •                | ¥ 8   |                                         |
| 10  | 4.987  | 5.001    | -0.014 | 420628 | 165206 | 52.3948          | R     | Tetrachloro-meta-xylene                 |
| 11  | 5.287  |          |        | 2419   | 316    |                  |       |                                         |
| 12  | 5.568  |          |        | 6014   | 1725   |                  |       |                                         |
| 13  | 5.746  | 5.761    | -0.016 | 114852 | 38147  | 53.8411          |       | BZ#8                                    |
| 14  | 6.025  |          |        | 1429   | 322    |                  |       |                                         |
| 15  | 6.683  | 6.701    | -0.018 | 138770 | 43361  | 54.2998          |       | BZ#18                                   |
| 16  | 7.384  |          |        | 1321   | 447    |                  |       |                                         |
| 17  | 7.752  |          |        | 1716   | 499    |                  |       |                                         |
| 18  | 7.907  | 7.925    | -0.018 | 221723 | 67052  | 50.9708          |       | BZ#28                                   |
| 19  | 8.550  |          |        | 633    | 127    |                  |       |                                         |
| 20  | 8.966  | 8.984    | -0.018 | 180721 | 51107  | 54.4218          |       | BZ#52                                   |
| 21  | 9.104  | 9.122    | -0.018 | 224170 | 58309  | 54.0716          |       | BZ#49                                   |
| 22  | 9.647  | 9.667    | -0.020 | 239445 | 63737  | 53.6655          |       | BZ#44                                   |
| 23  | 10.121 |          |        | 3817   | 776    |                  |       |                                         |
| 24  | 10.946 |          |        | 382    | 108    |                  |       |                                         |
| 25  | 11.225 | 11.243   | -0.018 | 255793 | 56544  | 50.0494,         |       | BZ#66                                   |
| 26  | 11.888 |          |        | 3813   | 716    |                  |       |                                         |
| 27  | 12.189 | 12.207   | -0.018 | 250369 | 57325  | 54.6743          |       | BZ#101                                  |
| 28  | 12.881 |          |        | 886    | 197    |                  |       |                                         |
| 29  | 13.300 | 13.318   | -0.018 | 515513 | 108920 | 106.900          |       | BZ#81                                   |
| 29  | 13.300 | 13.318   | -0.018 | 515513 | 108920 | 106.900          | M     | BZ#87                                   |
| 30  | 13.734 | 13.752   | -0.018 | 193250 | 29834  | 50.5649          |       | BZ#77                                   |
| 31  | 14.211 |          |        | 5959   | 873    |                  |       |                                         |
| 32  | 14.546 |          |        | 607    | 152    |                  |       |                                         |
| 33  | 14.807 | 14.825   | -0.018 | 259328 | 60129  | 52.3349          |       | BZ#123                                  |
| 34  | 14.920 | 14.938   | -0.018 | 302390 | 57570  | 52.6026          | M     | BZ#118                                  |
| 35  | 15.410 | 15.428   | -0.018 | 352512 | 75121  | 49.0639          | M     | BZ#114                                  |
| 36  | 15.716 |          |        | 9100   | 1504   |                  |       |                                         |
| 37  | 15.976 | 15.993   | -0.018 | 566602 | 91374  | 108.041          | M     | BZ#153                                  |
| 37  | 15.976 | 15.993   | -0.018 | 566602 | 91374  | 108.041          | M     | BZ#184                                  |
| 38  | 16.137 | 16.155   | -0.018 | 371297 | 67323  | 50.3214          | М     | BZ#105                                  |
| 39  | 17.308 | 17.328   | -0.020 | 344192 | 73130  | 54.4972          |       | BZ#138                                  |
| 40  | 17.742 | 17.762   | -0.020 | 217263 | 33798  | 50.9270          | М     | BZ#126                                  |
| 41  | 18.150 | 18.170   | -0.020 | 325630 | 66606  | 55.2200          |       | BZ#187                                  |
| 42  | 18.394 | 18.416   | -0.022 | 344467 | 72173  | 54.5820          |       | BZ#183                                  |
| 43  | 18.629 | 18.647   | -0.018 | 364640 | 79548  | 53.6000          |       | BZ#128                                  |
| 44  | 18.740 | 18.760   | -0.020 | 342583 | 61926  | 53.9829          | M     | BZ#167                                  |
| 45  | 19.445 |          |        | 1450   | 186    |                  |       |                                         |
| 46  | 19.864 | 19.886   | -0.022 | 351458 | 69214  | 51.0830          |       | BZ#156                                  |
| 47  | 20.152 | 20.174   | -0.022 | 370342 | 69136  | 51.4345          |       | BZ#157                                  |
| 48  | 20.513 |          | _      | 6025   | 990    |                  |       |                                         |
| 49  | 20.759 | 20.781   | -0.022 | 381929 | 76886  | 54.4883          |       | BZ#180                                  |
| 50  | 21.830 | 21.854   | -0.024 | 306389 | 48183  | 52.9658          |       | BZ#169                                  |
| 51  | 22.246 | 22.271   | -0.024 | 405816 | 80165  | 54.1318          |       | BZ#170                                  |
| 52  | 22.532 | 22.559   | -0.027 | 418592 | 81084  | 54.7574          | R     | BZ#198                                  |
| 53  | 22.978 |          |        | 6915   | - 1044 | 1010             |       |                                         |

Reported: 10/17/2002 09:44 rrm

|       |        |          |         |         |        | Extract  |       |                                         |
|-------|--------|----------|---------|---------|--------|----------|-------|-----------------------------------------|
| Peak  | Peak   | Expected | Delta   |         |        | Conc.    |       |                                         |
| No.   | RT     | RT       | RT      | Area    | Height | (ppb)    | Flags | Peak Identification                     |
| ===== |        | ======   | ======= | ======= |        | ======== |       | ======================================= |
| 54    | 23.791 | 23.820   | -0.029  | 399197  | 72777  | 53.0131  |       | BZ#189                                  |
| 55    | 24.523 | 24.552   | -0.029  | 440231  | 86019  | 55.1627  |       | BZ#195                                  |
| 56    | 24.880 |          |         | 2974    | 448    |          |       |                                         |
| 57    | 25.656 |          |         | 4525    | 877    |          |       | •                                       |
| 58    | 27.626 | 27.655   | -0.029  | 451590  | 80774  | 56.3495  |       | BZ#206                                  |
| 59    | 29.156 | 29.180   | -0.024  | 413244  | 88356  | 57.6624  | M     | BZ#209                                  |
| 60    | 31.140 |          |         | 268     | 50     |          |       |                                         |
| 61    | 31.308 |          |         | 231     | 67     |          |       |                                         |
| 62    | 31.570 |          |         | 866     | 247    |          |       |                                         |
| 63    | 31.663 |          |         | 1234    | 271    |          |       |                                         |
| 64    | 31.998 |          |         | 1134    | 134    |          |       |                                         |
| 65    | 32.217 |          |         | 2336    | 485    |          |       |                                         |
| 66    | 32.436 |          |         | 2511    | 398    |          |       |                                         |
| 67    | 32.569 |          |         | 2589    | 422    |          |       |                                         |
| 68    | 32.785 |          |         | 10258   | 1132   |          |       |                                         |
| 69    | 33.496 |          |         | 16599   | 2506   |          |       |                                         |
| 70    | 34.356 |          |         | 2062    | 366    |          |       |                                         |
|       |        |          |         |         |        |          |       |                                         |

Flags: A - Peak quantitates above calibration range

a - Peak quantitates below reporting limitH - User selected alternate compound hit

M - Peak manually integrated or manually identified

R - Peak fails recovery

U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

Target Compounds

| Peak   | Expected |                         |
|--------|----------|-------------------------|
| RT     | RT       | Target Compound         |
|        | =======  |                         |
| 4.987  | 5.001    | Tetrachloro-meta-xylene |
| 5.746  | 5.761    | BZ#8                    |
| 6.683  | 6.701    | BZ#18                   |
| 7.907  | 7.925    | BZ#28                   |
| 8.966  | 8.984    | BZ#52                   |
| 9.104  | 9.122    | BZ#49                   |
| 9.647  | 9.667    | BZ#44                   |
| 11.225 | 11.243   | BZ#66                   |
| 12.189 | 12.207   | BZ#101                  |
| 13.300 | 13.318   | BZ#87                   |
| 13.300 | 13.318   | BZ#81                   |
| 13.734 | 13.752   | BZ#77                   |
| 14.807 | 14.825   | BZ#123                  |
| 14.920 | 14.938   | BZ#118                  |
| 15.410 | 15.428   | BZ#114                  |
| 15.976 | 15.993   | BZ#153                  |
| 15.976 | 15.993   | BZ#184                  |
| 16.137 | 16.155   | BZ#105                  |
| 17.308 | 17.328   | BZ#138                  |
| 17.742 | 17.762   | BZ#126                  |
| 18.150 | 18.170   | BZ#187                  |
| 18.394 | 18.416   | BZ#183                  |
| 18.629 | 18.647   | BZ#128                  |
| 18.740 | 18.760   | BZ#167                  |
| 19.864 | 19.886   | BZ#156                  |
| 20.152 | 20.174   | BZ#157                  |
| 20.759 | 20.781   | BZ#180                  |
| 21.830 | 21.854   | BZ#169                  |
| 22.246 | 22.271   | BZ#170                  |
| 22.532 | 22.559   | BZ#198                  |
| 23.791 | 23.820   | BZ#189                  |
| 24.523 | 24 4552  | BZ#195                  |
| 27.626 | 27.655   | BZ#206                  |
| 29.156 | 29.180   | BZ#209                  |
|        |          |                         |

Client Sample ID: 32CONG-L3

Lab Sample ID: 32CONG-L3

|                                 | _            |             |              | Y            | (x10^5)                   |                                      |                        |            |                       |                       | i                                                               |
|---------------------------------|--------------|-------------|--------------|--------------|---------------------------|--------------------------------------|------------------------|------------|-----------------------|-----------------------|-----------------------------------------------------------------|
|                                 | ٥<br>• •     | 0.6-        | 0.7-         | <b>6</b>     | <b>9</b>                  | 1.1.                                 | 1.2                    | 1.3-       | 14.                   | 1.5-                  |                                                                 |
| (0.884)                         | •            |             |              |              |                           |                                      |                        |            |                       |                       |                                                                 |
| - (7,007                        | =:           |             |              |              |                           |                                      |                        |            |                       | = -                   |                                                                 |
|                                 |              |             |              |              |                           |                                      |                        |            |                       | =                     |                                                                 |
| €3.309)                         |              |             |              |              |                           |                                      |                        |            |                       |                       |                                                                 |
| (3.309)<br>G.544)<br>G.937)     |              |             |              |              |                           |                                      |                        |            |                       |                       | -                                                               |
| 44238 <del>3</del> )<br>14.686) |              |             |              |              |                           |                                      | <b>T</b>               |            |                       |                       |                                                                 |
| (5.293)<br>≡(5.573)             |              |             | BZ#8 (5.7    | 748)         | <del></del>               |                                      |                        |            | e <del>te nylen</del> | <del>e-(4,99</del> 0) | MZHOH:                                                          |
| <del>66.029</del> )             |              |             |              | (418 (6,688) |                           |                                      |                        |            |                       |                       | Instrument Column Integrator Method Reported                    |
| £7.388)                         |              |             |              | WID (6.600)  |                           |                                      |                        |            |                       |                       | boc degrammer orter                                             |
| <del>(7.756)</del>              | <del> </del> | <del></del> | H            | v            | BZ#28 (7.9                | 911)                                 |                        |            |                       |                       | ime<br>rat                                                      |
| (8,306)<br>38,559)              |              |             |              | BZ#52        | (8,963)<br>BZ(49) (9,108) |                                      |                        |            |                       |                       | a de la la la la la la la la la la la la la                     |
|                                 |              | ···         | <u> </u>     |              | BZ#44 (9,651)             | 1                                    |                        |            |                       |                       |                                                                 |
| 5(10.126)                       |              |             |              |              |                           |                                      |                        |            |                       | į                     |                                                                 |
| (10,948)                        |              |             |              |              | BZ#66 (11,227)            |                                      |                        |            |                       | j                     | 3327_1<br>RTX-5<br>Falcon<br>/var/ch<br>17-Oct-                 |
| (11,892)                        |              |             |              |              | -BZ#101 (12,192)          |                                      |                        |            |                       |                       | 327_1.<br>TX-5<br>alcon<br>var/ch<br>7-Oct-                     |
| C12.883)                        |              |             |              |              |                           |                                      |                        |            | 97#04 /**             | 7 702\                |                                                                 |
| 24.000                          |              | BZ#77       | (13,737)     |              |                           |                                      |                        |            | -BZ#81 (1             | 5.342)                | 3327_1.i<br>RTX-5<br>Falcon<br>/var/chem/3<br>17-Oct-2002       |
| <del>(14,215)</del><br>(14,546) |              |             |              |              | -BZ#7#12714142897)        |                                      | • .                    |            |                       |                       | /33                                                             |
| <b>≤</b> (15,718)               |              |             |              |              |                           | -BZ#114 (15.                         |                        |            |                       |                       | 327<br>09:                                                      |
|                                 |              |             |              |              | BZ#105 (16                | (140)                                | BZ#15                  | 3 (15.976) |                       |                       | 44                                                              |
|                                 |              |             |              |              | BZ#1                      | 38 (17.308)                          |                        |            |                       |                       | 6 1                                                             |
|                                 |              |             | BZ#126 (17.7 | 42>          |                           |                                      |                        |            |                       | ±<br>E                | mxx<br>01/<br>00<br>0                                           |
|                                 |              |             |              |              | BZ#16/ (18,/40            | 18,150)<br>183 (18,394)<br>)) BZ#128 | (18.629)               |            |                       | HultiChrom            | Dilut<br>Data<br>Data<br>Compo<br>100302<br>rm                  |
| 119,442)                        |              |             |              |              | BZ#156 (:                 | 19,864)                              |                        |            |                       | 8                     | Dilution Dilution Data File Compound L00302_1/c                 |
| £20.515)                        |              |             |              |              | BZ#157                    | 19,864)<br>7 (20,154)<br>BZ#180 (20  | . 759)                 |            |                       | 03oct                 | File and (                                                      |
|                                 |              |             |              |              |                           |                                      |                        |            |                       | 03oct021608, i261     |                                                                 |
|                                 |              |             |              | BZ#169 (2    | 21.832)                   | BZ#170                               | (22,251)<br>8 (22,535) |            |                       | 8.126                 | Factor<br>Sublis<br>30CT02                                      |
| \$(22.980)                      |              |             |              |              |                           | BZ#19                                | o (22,535)             |            |                       | "                     | 102                                                             |
| -                               |              | <del></del> |              |              | BZ#                       | 189 (23.796)                         |                        | •          |                       |                       | 160                                                             |
| (24,884)                        | <del></del>  | <del></del> |              | <del></del>  |                           | 1                                    | BZ#195 (24.            | 527)       |                       |                       | 890H0                                                           |
| 2(25.660)                       |              |             |              |              |                           |                                      |                        |            |                       |                       | 1001-2002 18:41<br>30ct021608-r261.d<br>11<br>.b/32CONG_3327RTX |
|                                 |              |             |              |              |                           |                                      |                        |            |                       |                       | ±02                                                             |
|                                 |              |             |              |              |                           |                                      | na /=                  |            |                       |                       | b/32CONG_                                                       |
| F                               |              |             |              |              |                           | BZ#206 (                             | c/. <b>631</b> )       |            |                       |                       | 80 8                                                            |
| -                               | <del></del>  |             |              |              |                           |                                      | -BZ#209 (29            | .158>      |                       |                       | 2 10:41<br>8-r261.d<br>_3327RTX5                                |
| F                               |              |             |              |              |                           |                                      |                        | •          |                       | n                     | 18:41<br>r261.<br>327RT                                         |
|                                 |              |             |              |              |                           |                                      |                        |            |                       |                       | TX:                                                             |
| (31,144)<br>(31,144)            |              |             |              |              |                           |                                      |                        |            |                       |                       |                                                                 |
| H3:463                          |              |             |              |              |                           |                                      |                        |            |                       |                       | _RAW.m                                                          |
| 32.787                          |              |             |              |              |                           |                                      |                        |            |                       |                       | ສ                                                               |
| (5°(33.494<br>(38:188)          | •            |             |              |              |                           |                                      |                        | ••         |                       |                       |                                                                 |
| rt34;358)                       |              |             |              |              |                           |                                      |                        |            |                       |                       |                                                                 |
|                                 |              |             |              |              |                           |                                      |                        |            |                       |                       |                                                                 |
|                                 |              |             |              |              | j 4                       |                                      |                        |            |                       |                       |                                                                 |
|                                 |              |             |              |              | 10                        |                                      |                        |            |                       |                       |                                                                 |
|                                 |              |             |              |              |                           |                                      |                        |            |                       |                       |                                                                 |
|                                 |              |             |              |              |                           |                                      |                        |            |                       |                       |                                                                 |
|                                 |              |             |              |              |                           | 02                                   | 21                     |            |                       |                       |                                                                 |
| - I                             |              |             |              |              |                           |                                      |                        |            |                       |                       |                                                                 |

Lab Sample ID: 32CONG-L3 Client Sample ID: 32CONG-L3

Matrix : WATER

Sample Type : CCALIB\_3
Injection Date : 04-OCT-2002 18:41
Dilution Factor : 1.00
Data File Analyst : W Instrument : 3327\_1.i

: RTX-5 : 03oct021608-r261.d Column Data File

Compound Sublist: all Integrator : Falcon

: /var/chem/3327\_1.i/100302\_1/030CT021608.b/32CONG\_3327RTX5\_RAW.m Method

Peaks

Reported : 17-Oct-2002 09:46 rrm

| l:        | D= -1-         | Dame = b = 2   | De1#=            |                  |                | Extract            |       |                         |
|-----------|----------------|----------------|------------------|------------------|----------------|--------------------|-------|-------------------------|
| eak<br>No | Peak<br>RT     | Expected<br>RT | Delta<br>RT      | Awas             | Hoicht         | Conc.              | Elaco | Dook Identification     |
| No.       | K1             | KI<br>TETTET   | KI<br>BBEEBBEE   | Area             | Height         | (ppb)              | Flags | Peak Identification     |
| 1         | 0.884          |                |                  | 55222            | 6687           |                    |       |                         |
| 2         | 3.309          |                |                  | 1969             | 594            |                    |       |                         |
| 3         | 3.544          |                |                  | 837              | 272            |                    |       |                         |
| 4         | 3.762          |                |                  | 7250             | 2495           |                    |       |                         |
| 5         | 3.937          |                |                  | 429              | 137            |                    |       |                         |
| 6         | 4.298          |                |                  | 456              | 94             |                    |       |                         |
| 7         | 4.389          |                |                  | 2652             | 1011           |                    |       |                         |
| 8         | 4.686          |                |                  | 1736             | 631            | _                  |       |                         |
| 9         | 4.990          | 5.001          | -0.011           | 410053           | 161760         | 51.3042            | R     | Tetrachloro-meta-xylene |
| 10        | 5.293          |                |                  | 1666             | 264            |                    |       |                         |
| 11        | 5.573          |                |                  | 5684             | 1670           |                    |       |                         |
| 12        | 5.748          | 5.761          | -0.013           | 111187           | 37181          | 52.4259            |       | BZ#8                    |
| 13        | 6.029          |                |                  | 1045             | 291            |                    | M     |                         |
| 14        | 6.688          | 6.701          | -0.013           | 135282           | 42734          | 53.4678            |       | BZ#18                   |
| 15        | 7.388          |                |                  | 1273             | 428            |                    |       |                         |
| 16        | 7.756          |                |                  | 1297             | 376            |                    |       |                         |
| 17        | 7.911          | 7.925          | -0.013           | 213544           | 64979          | 49.3991            |       | BZ#28                   |
| 18        | 8.306          |                |                  | 4230             | 993            |                    |       |                         |
| 19        | 8.559          | 0.004          | 0.016            | 388              | 86             | 53 1074            |       | DE#50                   |
| 20        | 8.969<br>9.108 | 8.984<br>9.122 | -0.016<br>-0.013 | 175351<br>213799 | 50007          | 53.1874            |       | BZ#52<br>BZ#49          |
| 21<br>22  | 9.108          | 9.122          | -0.013           | 229774           | 56939<br>62059 | 52.7429<br>52.2021 |       | BZ#49<br>BZ#44          |
| 23        | 10.126         | 9.007          | -0.016           | 3080             | 678            | 32.2021            |       | <i>B2#44</i>            |
| 24        | 10.128         |                |                  | 475              | 119            |                    |       |                         |
| 25        | 11.227         | 11.243         | -0.016           | 242929           | 54571          | 48.3334.           |       | BZ#66                   |
| 26        | 11.892         | 11.245         | 0.010            | 4929             | 684            | 40.3334.           |       | 52#00                   |
| 27        | 12.192         | 12.207         | -0.016           | 237472           | 55424          | 52.7903            |       | BZ#101                  |
| 28        | 12.883         |                |                  | 913              | 188            | 3_1                |       | ,                       |
| 29        | 13.302         | 13.318         | -0.016           | 497943           | 105012         | 103.056            |       | BZ#81                   |
| 29        | 13.302         | 13.318         | -0.016           | 497943           | 105012         | 103.056            | M     | BZ#87                   |
| 30        | 13.737         | 13.752         | -0.016           | 189899           | 28307          | 48.0891            |       | BZ#77                   |
| 31        | 14.215         |                |                  | 9813             | 1006           |                    |       |                         |
| 32        | 14.546         |                |                  | 1922             | 281            |                    |       |                         |
| 33        | 14.807         | 14.825         | -0.018           | 252260           | 57504          | 50.0638            |       | BZ#123                  |
| 34        | 14.920         | 14.938         | -0.018           | 293881           | 55490          | 50.7011            |       | BZ#118                  |
| 35        | 15.410         | 15.428         | -0.018           | 341524           | 73463          | 48.0180            |       | BZ#114                  |
| 36        | 15.718         |                |                  | 10255            | 1600           |                    |       |                         |
| 37        | 15.976         | 15.993         | -0.018           | 548726           | 89125          | 105.289            |       | BZ#153                  |
| 37        | 15.976         | 15.993         | -0.018           | 548726           | 89125          | 105.289            | М     | BZ#184                  |
| 38        | 16.140         | 16.155         | -0.016           | 338894           | 64247          | 48.1038            |       | BZ#105                  |
| 39        | 17.308         | 17.328         | -0.020           | 333735           | 69380          | 51.6640            |       | BZ#138                  |
| 40        | 17.742         | 17.762         | -0.020           | 209606           | 32040          | 48.3645            |       | BZ#126                  |
| 41        | 18.150         | 18.170         | -0.020           | 316229           | 65457          | 54.2290            |       | BZ#187                  |
| 42        | 18.394         | 18.416         | -0.022           | 333013           | 69583          | 52.5721            |       | BZ#183                  |
| 43        | 18.629         | 18.647         | -0.018           | 350446           | 77599          | 52.2843            |       | BZ#128                  |
| 44        | 18.740         | 18.760         | -0.020           | 332742           | 59844          | 52.1503            |       | BZ#167                  |
| 45        | 19.442         |                |                  | 1689             | 208            |                    |       |                         |
| 46        | 19.864         | 19.886         | -0.022           | 336521           | 64743          | 47.8735            |       | BZ#156                  |
| 47        | 20.154         | 20.174         | -0.020           | 356521           | 67140          | 49.9768            |       | BZ#157                  |
| 48        | 20.515         |                |                  | 7103             | 1079           |                    |       | 77/17 00                |
| 49        | 20.759         | 20.781         | -0.022           | 369861           | 73863          | 52.3104            |       | BZ#180                  |
| 50        | 21.832         | 21.854         | -0.022           | 291272           | 45736          | 50.2786            |       | BZ#169                  |
| 51        | 22.251         | 22.271         | -0.020           | 387818           | 77128          | 52.0585            |       | BZ#170                  |
| 52        | 22.535         | 22.559         | -0.024           | 402202           | 78875          | 53.2206            | ĸ     | BZ#198                  |

|       |        |          |        |        |         | Extract  |       |                     |
|-------|--------|----------|--------|--------|---------|----------|-------|---------------------|
| Peak  | Peak   | Expected | Delta  |        |         | Conc.    |       |                     |
| No.   | RT     | RT .     | RT     | Area   | Height  | (dqq)    | Flags | Peak Identification |
| ===== |        | =======  |        |        | ======= | ======== | ===== |                     |
| 54    | 23.796 | 23.820   | -0.024 | 380589 | 69640   | 50.7199  |       | BZ#189              |
| 55    | 24.527 | 24.552   | -0.024 | 420226 | 83254   | 53.3478  |       | BZ#195              |
| 56    | 24.884 |          |        | 2661   | 418     |          |       |                     |
| 57    | 25.660 |          |        | 4108   | 818     |          |       |                     |
| 58    | 27.631 | 27.655   | -0.024 | 429476 | 76281   | 53.0910  |       | BZ#206              |
| 59    | 29.158 | 29.180   | -0.022 | 393431 | 84352   | 54.8937  | M     | BZ#209              |
| 60    | 31.144 |          |        | 243    | 46      |          |       |                     |
| 61    | 31.572 |          |        | 902    | 250     |          |       |                     |
| 62    | 31.665 |          |        | 1242   | 280     |          |       |                     |
| 63    | 32.000 |          |        | 856    | 120     |          |       |                     |
| 64    | 32.221 |          |        | 1231   | 237     |          |       |                     |
| 65    | 32.443 |          |        | 2394   | 384     |          |       |                     |
| 66    | 32.583 |          |        | 2436   | 413     |          |       |                     |
| 67    | 32.787 |          |        | 6018   | 807     |          |       |                     |
| 68    | 33.494 |          |        | 12142  | 1591    |          |       |                     |
| 69    | 34.181 |          |        | 3251   | 331     |          |       |                     |
| 70    | 34.358 |          |        | 1188   | 281     |          |       |                     |
|       |        |          |        |        |         |          |       |                     |

Flags: A - Peak quantitates above calibration range

- a Peak quantitates below reporting limit
- H User selected alternate compound hit
- M Peak manually integrated or manually identified
- R Peak fails recovery
  U User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

\_\_\_\_ Target Compounds

| Peak   | Expected |                         |
|--------|----------|-------------------------|
| RT     | RT       | Target Compound         |
| ****** | =======  |                         |
| 4.990  | 5.001    | Tetrachloro-meta-xylene |
| 5.748  | 5.761    | BZ#8                    |
| 6.688  | 6.701    | BZ#18                   |
| 7.911  | 7.925    | BZ#28                   |
| 8.969  | 8.984    | BZ#52                   |
| 9.108  | 9.122    | BZ#49                   |
| 9.651  | 9.667    | BZ#44                   |
| 11.227 | 11.243   | BZ#66                   |
| 12.192 | 12.207   | BZ#101                  |
| 13.302 | 13.318   | BZ#87                   |
| 13.302 | 13.318   | BZ#81                   |
| 13.737 | 13.752   | BZ#77                   |
| 14.807 | 14.825   | BZ#123                  |
| 14.920 | 14.938   | BZ#118                  |
| 15.410 | 15.428   | BZ#114                  |
| 15.976 | 15.993   | BZ#153                  |
| 15.976 | 15.993   | BZ#184                  |
| 16.140 | 16.155   | BZ#105                  |
| 17.308 | 17.328   | BZ#138                  |
| 17.742 | 17.762   | BZ#126                  |
| 18.150 | 18.170   | BZ#187                  |
| 18.394 | 18.416   | BZ#183                  |
| 18.629 | 18.647   | BZ#128                  |
| 18.740 | 18.760   | BZ#167                  |
| 19.864 | 19.886   | BZ#156                  |
| 20.154 | 20.174   | BZ#157                  |
| 20.759 | 20.781   | BZ#180                  |
| 21.832 | 21.854   | BZ#169                  |
| 22.251 | 22.271   | BZ#170                  |
| 22.535 | 22.559   | BZ#198                  |
| 23.796 | 23.820   | BZ#189                  |
| 24.527 | 24 552   | BZ#195                  |
| 27.631 | 27.655   | BZ#206                  |
| 29.158 | 29.180   | BZ#209                  |
|        |          |                         |

## Burlington

# INITIAL CALIBRATION DATA

Start Cal Date End Cal Date 03-OCT-2002 03-OCT-2002 ESTD 3.50 Falcon 18:40 21:40

Quant Method Target Version

Integrator Method file Cal Date /var/chem/3327 2.i/100302\_1/030CT021607.b/32CONG\_3327RTXCLPII\_RAW.m
04-Oct-2002 12:18 rrm

Calibration File Names:
Level 1: /var/chem/3327\_2.i/100302\_1/030CT021607.b/03oct021607-r041.d
Level 2: /var/chem/3327\_2.i/100302\_1/030CT021607.b/03oct021607-r051.d
Level 3: /var/chem/3327\_2.i/100302\_1/030CT021607.b/03oct021607-r061.d
Level 4: /var/chem/3327\_2.i/100302\_1/030CT021607.b/03oct021607-r071.d
Level 5: /var/chem/3327\_2.i/100302\_1/030CT021607.b/03oct021607-r081.d

11

|         | _       | _            |          |                |         |         | -       | ,       | 0,00     |                                         |           |
|---------|---------|--------------|----------|----------------|---------|---------|---------|---------|----------|-----------------------------------------|-----------|
| 0.99794 | 0.00061 | 0.0          | -0.95231 | 321342   WLINR | •       | '       | 89534   | 45139   | 8902     |                                         |           |
| 0.99838 | 0.00042 | _            | 2.56520  | 482348   WLINR |         | 234109  | 109103  | 47772   | 7270     |                                         | 13 BZ#114 |
| 0.99987 | 0.00059 | _            | 1.00263  | 333214   WLINR |         | 167479  | 83739   | 39268   | 6784     |                                         | 14 BZ#118 |
| 0.99985 | 0.00057 | _            | 1.23200  | 345413   WLINR | 345     | 174308  | 86587   | 40501   | 6627     |                                         | 15 BZ#123 |
| 0.99941 | 0.00105 | 0.0          | 2.50881  | 190275   WLINR |         | 91982   | 44585   | 19896   | 2700     |                                         | 8 BZ#77   |
| 0.99978 | 0.00076 | _            | 2.58862  | 521982   WLINR | '       | •       | ٠       | 59978   | 10022    |                                         | 10 BZ#87  |
| 0.99978 | 0.00076 | _            | 2.58862  | 521982 WLINR   | •       | •       | ٠.      | 59978   | 10022    |                                         | 9 BZ#81   |
| 0.99758 | 0.00068 | _            | -1.25606 | 284650   WLINR |         | 150679  | 80265   | 40794   | 8231     |                                         | 11 BZ#101 |
| 0.99954 | 0.00061 | _            | 1.67912  | 330616 WLINR   | `       | 162454  | 78980   | 36028   | 6006     |                                         | 7 BZ#66   |
| 0.99824 | 0.00065 | _            | -0.89301 | 301387 WLINR   |         | 158622  | 83572   | 41791   | 8320     |                                         | 4 BZ#44   |
| 0.99730 | 0.00073 |              | -1.68428 | 267450   WLINR | 267     | 141280  | 76215   | 39204   | 8227     |                                         | 5 BZ#49   |
| 0.99594 | 0.00084 | _            | -2.22282 | 230838 WLINR   | 230     | 124213  | 67668   | 35213   | 7604     |                                         | 6 BZ#52   |
| 0.99980 | 0.00058 | _            | 1.07124  | 343465   WLINR | 343     | 173210  | 85333   | 39745   | 7012     |                                         | 3 BZ#28   |
| 0.99538 | 0.00104 | _            | -2.68457 | 186298   WLINR | 186     | 100369  | 55172   | 29235   | 6495     |                                         | 2 BZ#18   |
| 0.99788 | 0.00118 | _            | -1.42146 | 165840   WLINR | 165     | 87494   | 46481   | 23838   | 4944     |                                         | 1 BZ#8    |
|         |         |              |          |                |         |         |         |         |          | *************************************** |           |
| or R^2  | . m2    | m1           | <b>σ</b> | 5  Curve       | Level 5 | Level 4 | Level 3 | Level 2 | Level 1  |                                         | Compound  |
| *RSD    | ients   | Coefficients |          | _              | 200     | 100     | 50      | 25      | <u>"</u> |                                         |           |

STL Burlington

## INITIAL CALIBRATION DATA

Start Cal Date
End Cal Date
Quant Method
Target Version.
Integrator
Method file
Cal Date : 03-OCT-2002 18:40 : 03-OCT-2002 21:40 : ESTD : 3.50 : Falcon

/var/chem/3327\_2.i/100302\_1/030CT021607.b/32CONG\_3327RTXCLPII\_RAW.m

| ••    |  |
|-------|--|
| 04    |  |
| -Oct  |  |
| ,     |  |
| 2002  |  |
| 2     |  |
| 12    |  |
| 18    |  |
| 3 rrm |  |
|       |  |

| 0.99896 | 0.00042      | -0.16003 | 466213 WLINK   | 241368  | 123303  | 60886                                  | 11598   | 34 BZ#198 |
|---------|--------------|----------|----------------|---------|---------|----------------------------------------|---------|-----------|
|         | 0 00026      | - 8      | 745370 WITWP   | 1870781 |         | 94788                                  |         |           |
| 0.99692 | 0.00038      | -2.22659 | 507641   WLINR | 273462  | 146594  | 75639                                  | 17056   | 32 BZ#209 |
| 0.99872 | 0.00036      | -0.85299 | 552215   WLINR | 286941  | 151655  | 75265                                  | 15282   | 31 BZ#206 |
| 0.99962 | 0.00041      | 0.39995  | 486905   WLINR | 248523  | 126710  | 59628                                  | 11148   | 30 BZ#195 |
| 0.99969 | 0.00043      | 1.30453  | 467690   WLINR | 229338  | 113321  | 52430                                  | 9204    | 29 BZ#189 |
| 0.99976 | 0.00042      | 0.76598  | 466793   WLINR | 236160  | 119740  | 56258                                  | 9879    | 24 BZ#170 |
| 0.99986 | 0.00065      | 1.09227  | 308920 WLINR   | 151041  | 75279   | 35861                                  | 6247    | 23 BZ#169 |
| 0.99981 | 0.00044      | 0.44386  | 449485   WLINR | 228735  | 114928  | 55007                                  | 10251   | 25 BZ#180 |
| 0.99912 | 0.00045      | 1.89980  | 442528 WLINR   | 214633  | 103494  | 46641                                  | 7779    | 21 BZ#157 |
| 0.99811 | 0.00044      | 2.37167  | 456967   WLINR | 218167  | 102613  | 45457                                  | 7360    | 20 BZ#156 |
| 0.99970 | 0.00056      | 0.70283  | 352446   WLINR | 178798  | 91112   | 43165                                  | 7466    | 22 BZ#167 |
| 0.99963 | 0.00044      | 0.97859  | 447305   WLINR | 230090  | 113838  | 53427                                  | 9081    | 17 BZ#128 |
| 0.99911 | 0.00050      | -0.53326 | 396614   WLINR | 205341  | 106856  | 53003                                  | 10465   | 26 BZ#183 |
| 0.99829 | 0.00108      | -2.02878 | 361934   WLINR | 189311  | 100576  | 50351                                  | 10187   | 28 BZ#187 |
| 0.99829 | 0.00108      | -2.02878 | 361934   WLINR | 189311  | 100576  | 50351                                  | 10187   | 16 BZ#126 |
| 0.99925 | 0.00050      | 0.24037  | 394979 WLINR   | 205712  | 104398  | 50057                                  | 9165    | 18 BZ#138 |
| 0.99772 | 0.00047      | 2.77662  | 424839   WLINR | 204453  | 94992   | 40415                                  | 6174    | 12 BZ#105 |
| 0.99800 | 0.00055      | -1.35204 | 352924   WLINR | 186931  | 9,8719  | 50157                                  | 10485   | 27 BZ#184 |
| H II    |              |          |                |         |         | ************************************** |         |           |
| or R^2  | m1 m2        | p,       | Level 5  Curve | Level 4 | Level 3 | Level 2                                | Level 1 | Compound  |
| *RSD    | Coefficients | COE      | -              | -       |         |                                        | -       |           |

## STL Burlington

## INITIAL CALIBRATION DATA

Curve

Formula

Units

\*\*\*\*\*\*\*\*\* Amount

Wt Linear | Amt = b + m1\*Rsp

Start Cal Date End Cal Date Quant Method Target Version Integrator Method file Cal Date 03-OCT-2002 18:40 03-OCT-2002 21:40 ESTD 3.50 Falcon /var/chem/3327 2.i/100302\_1/03OCT021607.b/32CONG\_3327RTXCLPII\_RAW.m 04-Oct-2002 12:18 rrm

## STL Burlington

### COMPOUND LISTING

Method file

Quant Method Last Update : 04-Oct-2002 12:18

: GC DATA Data Type

Global Integrator : Falcon

Chromat Events Values **-----**-----Initial:Start Threshold 19.000000 Initial:End Threshold 9.500000 Initial:Area Threshold 190.000000 Initial:P-P Resolution 1.000000 Initial:Bunch Factor 5.000000 Initial:Negative Peaks OFF

Initial: Tension 2.000000

|    | Compound                   | RT       | RT Window     | RF        |
|----|----------------------------|----------|---------------|-----------|
|    |                            | <u> </u> |               |           |
| \$ | 33 Tetrachloro-meta-xylene | 5.391    | 5.341-5.441   | 2.614e-04 |
|    | 1 BZ#8                     | 6.592    | 6.542-6.642   | 1.178e-03 |
|    | 2 BZ#18                    |          | 7.648-7.748   | 1.042e-03 |
|    | 3 BZ#28                    | 9.137    | 9.087-9.187   | 5.775e-04 |
|    | 6 BZ#52                    |          | 10.291-10.391 | 8.401e-04 |
|    | 5 BZ#49                    | 10.480   | 10.430-10.530 | 7.296e-04 |
|    | 4 BZ#44                    | 11.312   | 11.262-11.362 | 6.476e-04 |
|    | 7 BZ#66                    | 13.056   | 13.006-13.106 | 6.051e-04 |
|    | 11 BZ#101                  | 13.914   | 13.864-13.964 | 6.841e-04 |
|    | 9 BZ#81                    | 15.421   | 15.371-15.471 | 7.580e-04 |
|    | 10 BZ#87                   |          | 15.371-15.471 |           |
|    | 8 BZ#77                    |          | 16.030-16.130 |           |
|    | 15 BZ#123                  | 16.946   | 16.896-16.996 | 5.721e-04 |
|    | 14 BZ#118                  |          | 17.025-17.125 | 5.948e-04 |
| l  | 13 BZ#114                  | 17.656   | 17.606-17.706 | 4.170e-04 |
|    | 19 BZ#153                  | 17.995   | 17.945-18.045 | 6.059e-04 |
| ļ  | 27 BZ#184                  | 17.802   | 17.752-17.852 | 5.531e-04 |
|    | 12 BZ#105                  | 18.720   | 18.670-18.770 | 4.749e-04 |
|    | 18 BZ#138                  | 19.713   | 19.663-19.763 |           |
|    | 16 BZ#126                  |          | 20.175-20.275 | 1.081e-03 |
|    | 28 BZ#187                  |          | 20.175-20.275 | 1.081e-03 |
|    | 26 BZ#183                  |          | 20.439-20.539 | 4.955e-04 |
|    | 17 BZ#128                  | 21.462   | 21.412-21.512 | 4.394e-04 |
|    | 22 BZ#167                  | 21.061-  | 21.011-21.111 | 5.594e-04 |
|    |                            |          |               |           |

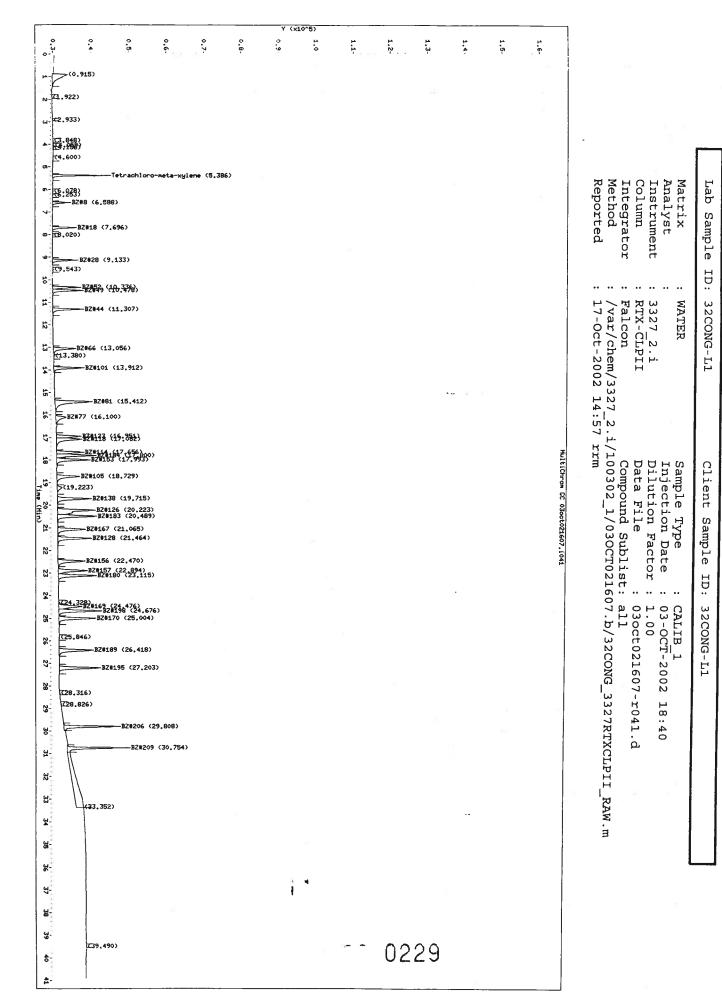
1 4

## STL Burlington

## COMPOUND LISTING

Method file : /var/chem/3327\_2.i/100302\_1/030CT021607.b/32CONG\_3327RTXCL

| Compound                                                                                                                          | RT                                                                                     | RT Window                                                                                                                                                              | RF                                                                                                                |
|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| 20 BZ#156<br>21 BZ#157<br>25 BZ#180<br>23 BZ#169<br>24 BZ#170<br>\$ 34 BZ#198<br>29 BZ#189<br>30 BZ#195<br>31 BZ#206<br>32 BZ#209 | 22.464<br>22.885<br>23.115<br>24.461<br>25.004<br>24.678<br>26.412<br>27.203<br>29.805 | 22.414-22.514<br>22.835-22.935<br>23.065-23.165<br>24.411-24.511<br>24.954-25.054<br>24.628-24.728<br>26.362-26.462<br>27.153-27.253<br>29.755-29.855<br>30.704-30.804 | 4.432e-04<br>4.546e-04<br>4.401e-04<br>6.487e-04<br>4.232e-04<br>4.215e-04<br>4.283e-04<br>4.052e-04<br>3.554e-04 |



Client Sample ID: 32CONG-L1 Lab Sample ID: 32CONG-L1

Matrix : WATER

Sample Type : CALIB\_1
Injection Date : 03-OCT-2002 18:40
Dilution Factor : 1.00
Data File Analyst : W

Instrument : 3327\_2.i Column : RTX-CLPII : 03oct021607-r041.d Data File

Peaks

Method : /var/chem/3327\_2.i/100 Reported : 17-Oct-2002 09:12 rrm

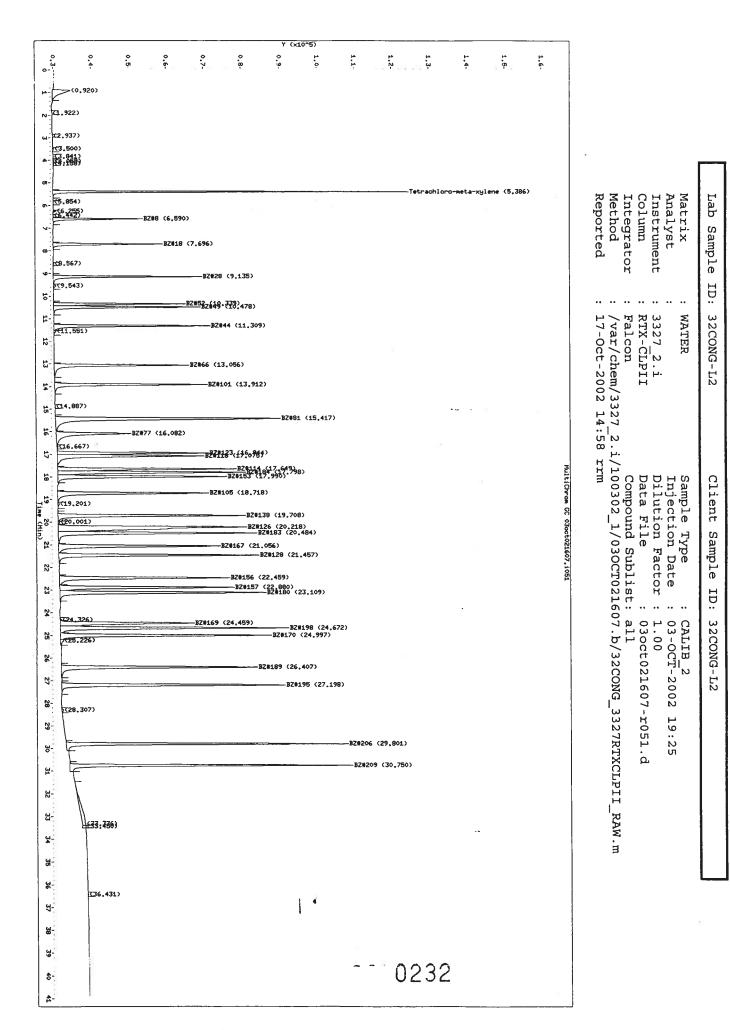
| De | ak       | Peak             | Expected         | Delta           |                |               | Extract<br>Conc.   |       |                         |
|----|----------|------------------|------------------|-----------------|----------------|---------------|--------------------|-------|-------------------------|
| N  | ю.       | RT               | RT               | RT              | Area           | Height        | (ppb)              | Flags | Peak Identification     |
| == | 1        | 0.915            | =======          |                 | 46788          | 3999          | **********         |       |                         |
|    | 2        | 1.922            |                  |                 | 247            | 27            |                    |       |                         |
|    | 3        | 2.933            |                  |                 | 217            | 50            |                    |       |                         |
|    | 4        | 3.848            |                  |                 | 421            | 89            |                    |       |                         |
|    | 5        | 4.059            |                  |                 | 1318           | 378           |                    |       |                         |
|    | 6        | 4.156            |                  |                 | 1247           | 198           |                    |       |                         |
|    | 7        | 4.600            |                  |                 | 1540           | 232           |                    | _     |                         |
| \$ | 8        | 5.386            | 5.391            | -0.004          | 42733          | 15468         | 4.67708            | R     | Tetrachloro-meta-xylene |
|    | 9        | 6.078            |                  |                 | 753            | 184           |                    |       |                         |
|    | 10<br>11 | 6.253<br>6.588   | 6.592            | -0.004          | 449<br>16990   | 158<br>4944   | 4.40287            |       | BZ#8                    |
|    | 12       | 7.696            | 7.698            | -0.002          | 23495          | 6495          | 4.08315            |       | BZ#18                   |
|    | 13       | 8.020            | 7.000            | 0.002           | 539            | 131           | 1.00313            |       | DU11 20                 |
|    | 14       | 9.133            | 9.137            | -0.004          | 26694          | 7012          | 5.12048            |       | BZ#28                   |
|    | 15       | 9.543            |                  |                 | 1285           | 268           |                    |       |                         |
|    | 16       | 10.336           | 10.341           | -0.004          | 29835          | 7604          | 4.16558            |       | BZ#52                   |
|    | 17       | 10.478           | 10.480           | -0.002          | 34485          | 8227          | 4.31814            |       | BZ#49                   |
|    | 18       | 11.307           | 11.312           | -0.004          | 36620          | 8320          | 4.49488            |       | BZ#44                   |
|    | 19       | 13.056           | 13.056           | 0.000           | 31580          | 6006          | 5.31356            |       | BZ#66                   |
|    | 20       | 13.380           |                  |                 | 1766           | 238           |                    |       |                         |
|    | 21       | 13.912           | 13.914           | -0.002          | 39453          | 8231          | 4.37512            |       | BZ#101                  |
|    | 22       | 15.412           | 15.421           | -0.009          | 72993          | 10022         | 10.1856            |       | BZ#81                   |
|    | 22       | 15.412           | 15.421           | -0.009          | 72993          | 10022         | 10.1856            | М     | BZ#87                   |
|    | 23       | 16.100           | 16.080           | 0.020           | 23366          | 2700          | 5.34803            |       | BZ#77                   |
|    | 24       | 16.951           | 16.946           | 0.004           | 32720          | 6627          | 5.02340.           | •     | BZ#123                  |
|    | 25       | 17.082           | 17.075           | 0.007           | 44070          | 6784          | 5.03749            |       | BZ#118                  |
|    | 26<br>27 | 17.656           | 17.656<br>17.802 | 0.000<br>-0.002 | 35790<br>53541 | 7270<br>10485 | 5.59648<br>4.44757 |       | BZ#114<br>BZ#184        |
|    | 28       | 17.800<br>17.993 | 17.802           | -0.002          | 47653          | 8902          | 4.44137            |       | BZ#153                  |
|    | 29       | 18.729           | 18.720           | 0.002           | 38805          | 6174          | 5.70888            |       | BZ#105                  |
|    | 30       | 19.223           | 201720           | 0.003           | 11496          | 1262          | 3111000            |       | 20,,200                 |
|    | 31       | 19.715           | 19.713           | 0.002           | 50481          | 9165          | 4.78261            |       | BZ#138                  |
|    | 32       | 20.223           | 20.225           | -0.002          | 74501          | 10187         | 8.98457            | M     | BZ#126                  |
|    | 32       | 20.223           | 20.225           | -0.002          | 74501          | 10187         | 8.98457            | M     | BZ#187                  |
|    | 33       | 20.489           | 20.489           | 0.000           | 58664          | 10465         | 4.65217            |       | BZ#183                  |
|    | 34       | 21.065           | 21.061           | 0.004           | 45495          | 7466          | 4.87950            |       | BZ#167                  |
|    | 35       | 21.464           | 21.462           | 0.002           | 49331          | 9081          | 4.96850            |       | BZ#128                  |
|    | 36       | 22.470           | 22.464           | 0.007           | 44616          | 7360          | 5.63394            |       | BZ#156                  |
|    | 37       | 22.894           | 22.885           | 0.009           | 45901          | 7779          | 5.43583            |       | BZ#157                  |
|    | 38       | 23.115           | 23.115           | 0.000           | 57617          | 10251         | 4.95528            |       | BZ#180                  |
|    | 39       | 24.328           |                  |                 | 1654           | 316           |                    |       |                         |
| _  | 40       | 24.476           | 24.461           | 0.016           | 39708          | 6247          | 5.14484            | _     | BZ#169                  |
| \$ | 41       | 24.676           | 24.678           | -0.002          | 64634          | 11598         | 4.72892            |       | BZ#198                  |
|    | 42       | 25.004           | 25.004           | 0.000           | 55326          | 9879          | 4.94696            |       | BZ#170                  |
|    | 43       | 25.846           | 26 412           | 0 003           | 1129           | 162<br>9204   | 5.24668            |       | BZ#189                  |
|    | 44       | 26.418<br>27.203 | 26.412<br>27.203 | 0.007<br>0.000  | 54078<br>60323 |               | 4.91692            |       | BZ#109<br>BZ#195        |
|    | 45<br>46 | 28.316           | 27.203           | 0.000           | 579            |               | 4.71072            |       | ωωπ ± / J               |
|    | 47       | 28.826           |                  |                 | 517<br>517     |               |                    |       |                         |
|    | 48       | 29.808           | 29.805           | 0.002           | 67680          | 15282         | 4.57753            |       | BZ#206                  |
|    | 49       | 30.754           | 30.754           | 0.000           | 74546          |               |                    |       | BZ#209                  |
|    | 50       | 33.352           | ·                |                 | 193323         | 1868          |                    |       |                         |
|    | 51       | 39.490           |                  |                 | 527            | 89            |                    |       |                         |

Flags: A - Peak quantitates above calibration range

- a Peak quantitates below reporting limitH User selected alternate compound hit
- $\ensuremath{\mathrm{M}}$  Peak manually integrated or manually identified
- R Peak fails recovery
- U User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

Target Compounds

| Peak   | Expected |                         |
|--------|----------|-------------------------|
| RT     | RT       | Target Compound         |
|        | =======  |                         |
| 5.386  | 5.391    | Tetrachloro-meta-xylene |
| 6.588  | 6.592    | BZ#8                    |
| 7.696  | 7.698    | BZ#18                   |
| 9.133  | 9.137    | BZ#28                   |
| 10.336 | 10.341   | BZ#52                   |
| 10.478 | 10.480   | BZ#49                   |
| 11.307 | 11.312   | BZ#44                   |
| 13.056 | 13.056   | BZ#66                   |
| 13.912 | 13.914   | BZ#101                  |
| 15.412 | 15.421   | BZ#87                   |
| 15.412 | 15.421   | BZ#81                   |
| 16.100 | 16.080   | BZ#77                   |
| 16.951 | 16.946   | BZ#123                  |
| 17.082 | 17.075   | BZ#118                  |
| 17.656 | 17.656   | BZ#114                  |
| 17.800 | 17.802   | BZ#184                  |
| 17.993 | 17.995   | BZ#153                  |
| 18.729 | 18.720   | BZ#105                  |
| 19.715 | 19.713   | BZ#138                  |
| 20.223 | 20.225   | BZ#126                  |
| 20.223 | 20.225   | BZ#187                  |
| 20.489 | 20.489   | BZ#183                  |
| 21.065 | 21.061   | BZ#167                  |
| 21.464 | 21.462   | BZ#128                  |
| 22.470 | 22.464   | BZ#156                  |
| 22.894 | 22.885   | BZ#157                  |
| 23.115 | 23.115   | BZ#180                  |
| 24.476 | 24.461   | BZ#169                  |
| 24.676 | 24.678   | BZ#198 ·                |
| 25.004 | 25.004   | BZ#170                  |
| 26.418 | 26.412   | BZ#189                  |
| 27.203 | 27.203   | BZ#195                  |
| 29.808 | 29.805   | BZ#206                  |
| 30.754 | 30.754   | BZ#209                  |
|        |          |                         |



Lab Sample ID: 32CONG-L2 Client Sample ID: 32CONG-L2

Matrix : WATER Analyst Sample Type : CALIB 2

Injection Date : 03-OCT-2002 19:25 Analyst : L. Instrument : 3327\_2.i

Dilution Factor: 1.00

Column : RTX-CLPII : 03oct021607-r051.d Data File

Integrator : Falcon Compound Sublist: all

Method : /var/chem/3327\_2.i/100302\_1/03OCT021607.b/32CONG\_3327RTXCLPII\_RAW.m Reported : 17-Oct-2002 09:12 rrm

|             |                    |                |             |                  | Pe             | aks                |       |                           |
|-------------|--------------------|----------------|-------------|------------------|----------------|--------------------|-------|---------------------------|
| Dools       | D1-                | P              | D-14-       |                  |                | Extract            |       |                           |
| Peak<br>No. | Peak<br>RT         | Expected<br>RT | Delta<br>RT | Area             | Height         | Conc.<br>(ppb)     | Flags | Peak Identification       |
| =====       |                    |                |             | ======           | =======        |                    | ===== | FEAR INCILITATION         |
| 1           | 0.920              |                |             | 51354            | 4777           |                    |       |                           |
| 2           | 1.922              |                |             | 251              | 29             |                    |       |                           |
| 3           | 2.937              |                |             | 208              | 43             |                    |       |                           |
| 4           | 3.500              |                |             | 1030             | 314            |                    |       |                           |
| 5           | 3.841              |                |             | 852              | 209            |                    |       |                           |
| 6           | 4.059              |                |             | 955              | 272            |                    |       |                           |
| 7<br>8      | 4.158              | 5 201          | 0.004       | 1208             | 187            |                    | _     |                           |
| 9           | 5.386<br>5.854     | 5.391          | -0.004      | 266121           | 94788          | 25.4107            | R     | Tetrachloro-meta-xylene   |
| 10          | 6.255              |                |             | 1021             | 116            |                    |       |                           |
| 11          | 6.442              |                |             | 2331<br>415      | 810            |                    |       |                           |
| 12          | 6.590              | 6.592          | -0.002      | 82773            | 138<br>23838   | 26.6612            |       | Dane                      |
| 13          | 7.696              | 7.698          | -0.002      | 110378           | 29235          | 27.7780            |       | BZ#8                      |
| 14          | 8.567              | .,,,,,         |             | 659              | 210            | 27.7760            |       | BZ#18                     |
| 15          | 9.135              | 9.137          | -0.002      | 147393           | 39745          | 24.0229            |       | BZ#28                     |
| 16          | 9.543              |                |             | 4035             | 694            |                    |       | <i>ΣΣ</i> <sub>π</sub> 20 |
| 17          | 10.339             | 10.341         | -0.002      | 142864           | 35213          | 27.3609            |       | BZ#52                     |
| 18          | 10.478             | 10.480         | -0.002      | 168038           | 39204          | 26.9189            |       | BZ#49                     |
| 19          | 11.309             | 11.312         | -0.002      | 179718           | 41791          | 26.1701            |       | BZ#44                     |
| 20          | 11.551             |                |             | 3474             | 572            |                    |       |                           |
| 21          | <sup></sup> 13.056 | 13.056         | 0.000       | 177380           | 36028          | 23.4810            |       | BZ#66                     |
| 22          | 13.912             | 13.914         | -0.002      | 198395           | 40794          | 26.6529            |       | BZ#101                    |
| 23          | 14.887             |                |             | 424              | 102            |                    |       |                           |
| 24          | 15.417             | 15.421         | -0.004      | 395808           | 59978          | 48.0538            |       | BZ#81                     |
| 24          | 15.417             | 15.421         | -0.004      | 395808           | 59978          | 48.0538.           | M     | BZ#87                     |
| 25          | 16.082             | 16.080         | 0.002       | 139047           | 19896          | 23.4307            |       | BZ#77                     |
| 26          | 16.667             |                |             | 1982             | 296            |                    |       |                           |
| 27          | 16.944             | 16.946         | -0.002      | 190245           | 40501          | 24.4032            |       | BZ#123                    |
| 28          | 17.075             | 17.075         | 0.000       | 220516           | 39268          | 24.3577            |       | BZ#118                    |
| 29          | 17.649             | 17.656         | -0.007      | 219646           | 47772          | 22.4841            |       | BZ#114                    |
| 30          | 17.798             | 17.802         | -0.004      | 260158           | 50157          | 26.3915            |       | BZ#184                    |
| 31          | 17.990             | 17.995         | -0.004      | 236245           | 45139          | 26.3972            |       | BZ#153                    |
| 32          | 18.718             | 18.720         | -0.002      | 215638           | 40415          | 21.9712            |       | BZ#105                    |
| 33<br>34    | 19.201             | 10 717         | 0.004       | 3252             | 420            |                    |       |                           |
| 35          | 19.708<br>20.001   | 19.713         | -0.004      | 258687           | 50057          | 25.0490            |       | BZ#138                    |
| 36          | 20.001             | 20.225         | -0.007      | 2656             | 460            | F2 4066            |       |                           |
| 36          | 20.218             | 20.225         | -0.007      | 400618<br>400618 | 50351          | 52.4066            |       | BZ#126                    |
| 37          | 20.484             | 20.489         | -0.004      | 291562           | 50351<br>53003 | 52.4066            | M     | BZ#187                    |
| 38          | 21.056             | 21.061         | -0.004      | 244136           | 43165          | 25.7299            |       | BZ#183                    |
| 39          | 21.457             | 21.462         | -0.004      | 273098           | 53427          | 24.8504            |       | BZ#167                    |
| 40          | 22.459             | 22.464         | -0.004      | 247303           | 45457          | 24.4527<br>22.5202 |       | BZ#128                    |
| 41          | 22.880             | 22.885         | -0.004      | 249694           | 46641          | 23.1010            |       | BZ#156                    |
| 42          | 23.109             | 23.115         | -0.007      | 296362           | 55007          | 24.6522            | 12    | BZ#157<br>BZ#180          |
| 43          | 24.326             |                |             | 1647             | 409            | 24.0322            |       | BZ#180                    |
| 44          | 24.459             | 24.461         | -0.002      | 214007           | 35861          | 24.3561            |       | BZ#169                    |
| 45          | 24.672             | 24.678         | -0.007      | 325876           | 60886          | 25.5055            | R     | BZ#109                    |
| 46          | 24.997             | 25.004         | -0.007      | 294426           | 56258          | 24.5754            |       | BZ#170                    |
| 47          | 25.226             |                |             | 7144             | 862            |                    |       | nV                        |
| 48          | 26.407             | 26.412         | -0.004      | 290862           | 52430          | 23.7607            |       | BZ#189                    |
| 49          | 27.198             | 27.203         | -0.004      | 327736           | 59628          | 24.5602            |       | BZ#195                    |
| 50          | 28.307             |                |             | 2768             | 534            |                    |       | <del>-</del>              |
| 51          | 29.801             | 29.805         | -0.004      | 340941           | 75265          | 25.8927            |       | BZ#206                    |
| 52          | 30.750             | 30.754         | -0.004      | 333445           |                | 233                |       | BZ#209                    |
| 53          | 33.336             |                |             | 55286            |                |                    |       |                           |

|       |        |          |       |      |      |      | Extract |       |                     |
|-------|--------|----------|-------|------|------|------|---------|-------|---------------------|
| Peak  | Peak   | Expected | Delta |      |      |      | Conc.   |       |                     |
| No.   | RT     | RT       | RT    | Area | Hei  | ght  | (ppb)   | Flags | Peak Identification |
| ===== |        |          |       |      | ==== | ==== | *****   | ===== |                     |
| 54    | 33.450 |          |       | 6324 |      | 993  |         |       |                     |
| 55    | 36 431 |          |       | 682  |      | 137  |         |       |                     |

Flags: A - Peak quantitates above calibration range

a - Peak quantitates below reporting limit

H - User selected alternate compound hit

M - Peak manually integrated or manually identified

R - Peak fails recovery

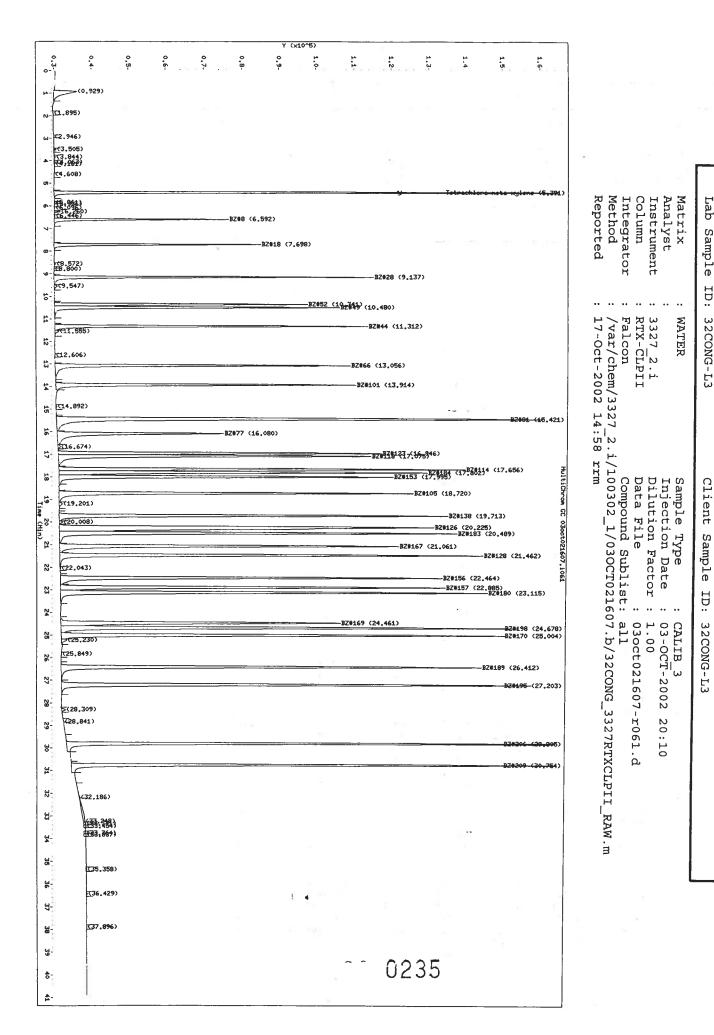
U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

| T     | _  | C        | _ |
|-------|----|----------|---|
| Tarde | E. | Compound | 5 |

| Peak   | Expected |                         |
|--------|----------|-------------------------|
| RT     | RT       | Target Compound         |
|        |          | rarget compound         |
| 5.386  | 5.391    | Tetrachloro-meta-xylene |
| 6.590  | 6.592    | BZ#8                    |
| 7.696  | 7.698    | BZ#18                   |
| 9.135  | 9.137    | BZ#28                   |
| 10.339 | 10.341   | BZ#52                   |
| 10.478 | 10.480   | BZ#49                   |
| 11.309 | 11.312   | BZ#44                   |
| 13.056 | 13.056   | BZ#66                   |
| 13.912 | 13.914   | BZ#101                  |
| 15.417 | 15.421   | BZ#87                   |
| 15.417 | 15.421   | BZ#81                   |
| 16.082 | 16.080   | BZ#77                   |
| 16.944 | 16.946   | BZ#123                  |
| 17.075 | 17.075   | BZ#118                  |
| 17.649 | 17.656   | BZ#114                  |
| 17.798 | 17.802   | BZ#184                  |
| 17.990 | 17.995   | BZ#153                  |
| 18.718 | 18.720   | BZ#105                  |
| 19.708 | 19.713   | BZ#138                  |
| 20.218 | 20.225   | BZ#126                  |
| 20.218 | 20.225   | BZ#187                  |
| 20.484 | 20.489   | BZ#183                  |
| 21.056 | 21.061   | BZ#167                  |
| 21.457 | 21.462   | BZ#128                  |
| 22.459 | 22.464   | BZ#156                  |
| 22.880 | 22.885   | BZ#157                  |
| 23.109 | 23.115   | BZ#180                  |
| 24.459 | 24.461   | BZ#169                  |
| 24.672 | 24.678   | BZ#198                  |
| 24.997 | 25.004   | BZ#170                  |
| 26.407 | 26.412   | BZ#189                  |
| 27.198 | 27.203   | BZ#195                  |
| 29.801 | 29.805   | B2#206                  |
| 30.750 | 30.754   | BZ#209                  |

Lab

H.



Lab Sample ID: 32CONG-L3 Client Sample ID: 32CONG-L3

: WATER Matrix Sample Type : CALIB 3

Injection Date : 03-OCT-2002 20:10 Analyst

Instrument : 3327 2.i Dilution Factor: 1.00

: 03oct021607-r061.d Column : RTX-CLPII Data File

Integrator : Falcon Compound Sublist: all

: /var/chem/3327\_2.i/100302\_1/030CT021607.b/32CONG\_3327RTXCLPII\_RAW.m Method

Peaks

Reported : 17-Oct-2002 09:12 rrm

| ŗ  | eak      | Peak             | Expected         | Delta |                  |                | Extract<br>Conc.   |       |                          |
|----|----------|------------------|------------------|-------|------------------|----------------|--------------------|-------|--------------------------|
|    | No.      | RT               | RT               | RT    | Area             | Height         | (ppb)              | Flags | Peak Identification      |
| =  | ====     | =======          |                  |       |                  |                |                    | ===== |                          |
|    | _ 1      | 0.929            |                  |       | 62233            | 6172           |                    |       |                          |
|    | 2        | 1.895            |                  |       | 391              | 63             |                    |       |                          |
|    | 3        | 2.946            |                  |       | 247              | 49             |                    |       |                          |
|    | = 4      | 3.505            |                  |       | 2120             | 631            |                    |       |                          |
|    | 5        | 3.844            |                  |       | 1489             | 361            |                    |       |                          |
|    | 6<br>7   | 4.063            |                  |       | 1165             | 357            |                    |       |                          |
|    | 8        | 4.161            |                  |       | 1306<br>632      | 195<br>103     |                    |       |                          |
| \$ | 9        | 5.391            | 5.391            | 0.000 | 591027           | 198952         | 52.6383            | 10 S  | Tetrachloro-meta-xylene  |
| ٧  | 10       | 5.861            | 3.391            | 0.000 | 351027           | 198932         | 52.0303            | K     | recracifforo-meca-xyrene |
|    | 11       | 5.936            |                  |       | 1061             | 242            |                    |       |                          |
|    | 12       | 6.096            |                  |       | 414              | 116            |                    |       |                          |
|    | 13       | 6.260            |                  |       | 4759             | 1639           |                    |       |                          |
|    | 14       | 6.446            |                  |       | 871              | 281            |                    |       |                          |
|    | 15       | 6.592            | 6.592            | 0.000 | 163728           | 46481          | 53.3360            |       | BZ#8                     |
|    | 16       | 7.698            | 7.698            | 0.000 | 213153           | 55172          | 54.8041            |       | BZ#18                    |
|    | 17       | 8.572            |                  |       | 1371             | 427            |                    |       |                          |
|    | 18       | 8.800            |                  |       | 204              | 66             |                    |       |                          |
|    | 19       | 9.137            | 9.137            | 0.000 | 319694           | 85333          | 50.3487            |       | BZ#28                    |
|    | 20       | 9.547            |                  |       | 5313             | 789            |                    |       |                          |
|    | 21       | 10.341           | 10.341           | 0.000 | 280648           | 67668          | 54.6276            |       | BZ#52                    |
|    | 22       | 10.480           | 10.480           | 0.000 | 337341           | 76215          | 53.9222            |       | BZ#49                    |
|    | 23       | 11.312           | 11.312           | 0.000 | 360769           | 83572          | 53.2268            |       | BZ#44                    |
|    | 24       | 11.555           |                  |       | 6588             | 1068           |                    |       |                          |
|    | 25       | 12.606           |                  |       | 509              | 128            |                    |       |                          |
|    | 26       | 13.056           | 13.056           | 0.000 | 378251           | 78980          | 49.4728            |       | BZ#66                    |
|    | 27       | 13.914           | 13.914           | 0.000 | 392515           | 80265          | 53.6567            |       | BZ#101                   |
|    | 28       | 14.892           |                  |       | 1140             | 235            |                    |       |                          |
|    | 29       | 15.421           | 15.421           | 0.000 | 830251           | 130413         | 101.446            |       | BZ#81                    |
|    | 29       | 15.421           | 15.421           | 0.000 | 830251           | 130413         | 101.446            | М     | BZ#87                    |
|    | 30       | 16.080           | 16.080           | 0.000 | 282441           | 44585          | 49.3927            |       | BZ#77                    |
|    | 31       | 16.674           |                  |       | 4856             | 650            |                    |       |                          |
|    | 32       | 16.946           | 16.946           | 0.000 | 409965           | 86587          | 50.7696            |       | BZ#123                   |
|    | 33       | 17.075           | 17.075           | 0.000 | 460541           | 83739          | 50.8073            |       | BZ#118                   |
|    | 34       | 17.656           | 17.656           | 0.000 | 506718           | 109103         | 48.0566            |       | BZ#114                   |
|    | 35<br>36 | 17.802<br>17.995 | 17.802           | 0.000 | 517961           | 98719          | 53.2528            |       | BZ#184                   |
|    | 37       | 18.720           | 17.995<br>18.720 | 0.000 | 478907<br>478592 | 89534<br>94992 | 53.2960<br>47.8919 |       | BZ#153<br>BZ#105         |
|    | 38       | 19.201           | 18.720           | 0.000 | 6726             | 884            | 47.0313            |       | B2#103                   |
|    | 39       | 19.713           | 19.713           | 0.000 | 541370           | 104398         | 51.9808            |       | BZ#138                   |
|    | 40       | 20.008           | 17.713           | 0.000 | 5257             | 910            | 31.5000            |       | B2#130                   |
|    | 41       | 20.225           | 20.225           | 0.000 | 825823           | 100576         | 106.706            |       | BZ#126                   |
|    | 41       | 20.225           | 20.225           | 0.000 | 825823           | 100576         | 106.706            | м     | BZ#187                   |
|    | 42       | 20.489           | 20.489           | 0.000 | 589368           | 106856         | 52.4142            |       | BZ#187                   |
|    | 43       | 21.061           | 21.061           | 0.000 | 505434           | 91112          | 51.6732            |       | BZ#167                   |
|    | 44       | 21.462           | 21.462           | 0.000 | 594303           | 113838         | 50.9954            |       | BZ#128                   |
|    | 45       | 22.043           |                  |       | 1073             | 179            |                    |       | <del></del>              |
|    | 46       | 22.464           | 22.464           | 0.000 | 546584           | 102613         | 47.8542            |       | BZ#156                   |
|    | 47       | 22.885           | 22.885           | 0.000 | 545938           | 103494         | 48.9441            |       | BZ#157                   |
|    | 48       | 23.115           | 23.115           | 0.000 | 622085           | 114928         | 51.0232            |       | BZ#180                   |
|    | 49       | 24.461           | 24.461           | 0.000 | 448753           | 75279          | 49.9274            |       | BZ#169                   |
| \$ | 50       | 24.678           | 24.678           | 0.000 | 674129           | 123303         | 51.8164            | R     | BZ#198                   |
| •  | 51       | 25.004           | 25.004           | 0.000 | 632278           | 119740         | 51.4423            |       | BZ#170                   |
|    | 52       | 25.230           |                  |       | 10684            | 1489           |                    |       |                          |
|    | 53       | 25.849           |                  |       | 997              | 11 0/12        | 0236               |       |                          |

|      |        |          |        |         |        | Extract |       |                     |
|------|--------|----------|--------|---------|--------|---------|-------|---------------------|
| Peak | Peak   | Expected | Delta  |         |        | Conc.   |       |                     |
| No.  | RT     | RT       | RT     | Area    | Height | (ppb)   | Flags | Peak Identification |
|      |        |          | ====== | ======= |        |         |       | **************      |
| 54   | 26.412 | 26.412   | 0.000  | 6,23733 | 113321 | 49.8408 |       | BZ#189              |
| 55   | 27.203 | 27.203   | 0.000  | 699164  | 126710 | 51.7406 |       | BZ#195              |
| 56   | 28.309 |          |        | 5601    | 1090   |         |       |                     |
| 57   | 28.841 |          |        | 225     | 28     |         |       | •                   |
| 58   | 29.805 | 29.805   | 0.000  | 705048  | 151655 | 53.0382 |       | BZ#206              |
| 59   | 30.754 | 30.754   | 0.000  | 652163  | 146594 | 53.9653 |       | BZ#209              |
| 60   | 32.186 |          |        | 2626    | 226    |         |       |                     |
| 61   | 33.248 |          |        | 22631   | 360    |         |       |                     |
| 62   | 33.341 |          |        | 3355    | 609    |         |       |                     |
| 63   | 33.454 |          |        | 3854    | 670    |         |       |                     |
| 64   | 33.764 |          |        | 3247    | 516    |         |       |                     |
| 65   | 33.837 |          |        | 4103    | 613    |         |       |                     |
| 66   | 35.358 |          |        | 2663    | 287    |         |       |                     |
| 67   | 36.429 |          |        | 1737    | 309    |         |       |                     |
| 68   | 37.896 |          |        | 783     | 127    |         |       |                     |

Flags: A - Peak quantitates above calibration range

a - Peak quantitates below reporting limit

H - User selected alternate compound hit
M - Peak manually integrated or manually identified

R - Peak fails recovery

U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

Target Compounds

| Peak   | Expected |                         |
|--------|----------|-------------------------|
| RT     | RT       | Target Compound         |
|        | =======  |                         |
| 5.391  | 5.391    | Tetrachloro-meta-xylene |
| 6.592  | 6.592    | BZ#8                    |
| 7.698  | 7.698    | BZ#18                   |
| 9.137  | 9.137    | BZ#28                   |
| 10.341 | 10.341   | BZ#52                   |
| 10.480 | 10.480   | BZ#49                   |
| 11.312 | 11.312   | BZ#44                   |
| 13.056 | 13.056   | BZ#66                   |
| 13.914 | 13.914   | BZ#101                  |
| 15.421 | 15.421   | BZ#87                   |
| 15.421 | 15.421   | BZ#81                   |
| 16.080 | 16.080   | BZ#77                   |
| 16.946 | 16.946   | BZ#123                  |
| 17.075 | 17.075   | BZ#118                  |
| 17.656 | 17.656   | BZ#114                  |
| 17.802 | 17.802   | BZ#184                  |
| 17.995 | 17.995   | BZ#153                  |
| 18.720 | 18.720   | BZ#105                  |
| 19.713 | 19.713   | BZ#138                  |
| 20.225 | 20.225   | BZ#126                  |
| 20.225 | 20.225   | BZ#187                  |
| 20.489 | 20.489   | BZ#183                  |
| 21.061 | 21.061   | BZ#167                  |
| 21.462 | 21.462   | BZ#128                  |
| 22.464 | 22.464   | BZ#156                  |
| 22.885 | 22.885   | BZ#157                  |
| 23.115 | 23.115   | BZ#180                  |
| 24.461 | 24.461   | BZ#169                  |
| 24.678 | 24.678   | BZ#198                  |
| 25.004 | 25.004   | BZ#170                  |
| 26.412 | 26.412   | BZ#189                  |
| 27.203 | 27.203   | BZ#195                  |
| 29.805 | 29.805   | BZ#206                  |
| 30.754 | 30.754   | BZ#209                  |
|        |          |                         |

|                                          | 1,1, 1,4         | 1.6- m. sg                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |
|------------------------------------------|------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| (0,931)                                  |                  |                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |
| T3.924)                                  |                  |                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |
| rz,935)                                  |                  |                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |
| ≥(3,500)<br>}<br>};;;82}}                |                  | 1                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | _         |
| <del>(4</del> .602)                      |                  |                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |
| (5.852)<br>(6.091)<br>(6.442)<br>(6.442) | Tetrachioro meta | <del>-xylene (5,30</del> 6)     | Ma<br>Co<br>In<br>Re                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ьаь       |
| 76. (42)55)                              | BZN8 (6.586)     |                                 | Matrix<br>Analyst<br>Instrum<br>Column<br>Integra<br>Method<br>Reporte                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |
| F8.015)                                  | BZ#18 (7,692)    |                                 | Matrix Analyst Instrument Column Integrator Method Reported                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Sampie    |
| 188 (12)<br>188 (12)<br>188 (798)        |                  |                                 | ent<br>tor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ր<br>Մ    |
| 559,543)                                 | <del></del>      | <del> 92#29 - (9,43</del> 0)    | ř.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           |
|                                          |                  | <del>32452</del> (18,336)       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Į.        |
| C11.170)<br>\$7(11.549)                  |                  | <del>D2#11 (11,30</del> 7)      | WATER 3327_2 RTX-CL Falcon /var/cl                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 3 2 6     |
|                                          |                  |                                 | TER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2CONG-14  |
| (12.905)                                 | <u></u>          | <del>82#66 (47,05</del> 2)      | WATER  3327_2.i RTX-CLPII Falcon /var/chem/3327 17-Oct-2002 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 4-1       |
|                                          |                  | <del>238404 (43,94</del> 0)     | 0000<br>E T                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1         |
| 57(4,883)                                | -u a d           | D7#04 445                       | W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           |
|                                          | 32877 (16,071)   | <del>- 87#81 (15,419</del> )    | •• 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |
| ST16.669)                                |                  | D24122 446+041)                 | 80 ·                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |
|                                          |                  | REMARKS THE REST                | 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1         |
| A(18, 285)                               |                  | DZ#105 (10,715)                 | Sample Typ<br>Injection Dilution F<br>Dilution F<br>Data File<br>Compound S<br>100302_1/03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |
| \$719.190)                               |                  | 8<br>8<br>8<br>8<br>8<br>8<br>8 | plecting in the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the contr | 1         |
| <b>₹</b> (20,003)                        |                  | 878126 (20.220 S                | e Tion<br>Fill                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |
|                                          |                  | BZ#167 621,054 P                | Type<br>on D<br>on Fac<br>le<br>ld Sul                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ardine    |
| 722.036)<br>22.253)                      |                  | D74456 (20 457%                 | Pe Date Factor Sublis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1         |
|                                          |                  | 121100 (21:100)                 | Ype : C<br>in Date : 0<br>Factor : 1<br>e : 0<br>Sublist: a<br>030CT021607                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1         |
|                                          | •                | 31                              | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Ι.        |
| 3(5.7%)                                  |                  | B28170 424,997)                 | CALIB_4<br>03-OCT-2<br>1.00<br>130Ct021<br>all<br>all<br>)7.b/32CC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | O COMO DE |
| 7(25,225)<br>(725,481)<br>(725,837)      |                  |                                 | JIB<br>OCT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |
|                                          |                  | <del>87#189 (26,40</del> 7)     | B_4<br>CT-2002 20:55<br>:t021607-r071.d<br>32CONG_3327RTXCLPII                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ,         |
|                                          |                  | <del>-BZ#195 (27,19</del> 6)    | 2003<br>1607                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1         |
| ©(28.302)<br>(28.814)                    |                  |                                 | 2 2<br>7-r<br>_33                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           |
| (29,510)                                 |                  | <del>DZW206 (29,001</del> )     | 20:55<br>r071.d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |
|                                          |                  | <del>87#209 (30,74</del> 7)     | 55<br>L.d.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |
|                                          |                  | ,                               | CLI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |
| (432,175)                                |                  |                                 | , ŭ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1         |
| (32,585)<br>(33,147)                     |                  |                                 | ا <del>ب</del> ر                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ı         |
| <del>73</del> 3,3 <del>69</del> )        |                  |                                 | RAW.m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1         |
| 4.34.52o)                                |                  |                                 | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           |
| 5 <u>735</u> ,349)<br>#35,832)           |                  | #1<br>(2)                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | L         |
| 7(36,422)                                |                  |                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |
| (37,435)                                 |                  |                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |
|                                          |                  |                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |
|                                          |                  |                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |
|                                          | 77 0238          |                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |
|                                          | <u> </u>         |                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |

Lab Sample ID: 32CONG-L4 Client Sample ID: 32CONG-L4

Matrix : WATER Sample Type : CALIB 4

Analyst en Analyst :  $\mathbb{C}^{N}$  Instrument : 3327\_2.i Injection Date : 03-OCT-2002 20:55

Dilution Factor: 1.00

Column : RTX-CLPII Data File : 03oct021607-r071.d

Integrator : Falcon Compound Sublist: all

Method : /var/chem/3327\_2.i/100302\_1/03OCT021607.b/32CONG\_3327RTXCLPII\_RAW.m Reported : 17-Oct-2002 09:13 rrm

|          |                  |          |        |                 |                         | Extract |       |                         |
|----------|------------------|----------|--------|-----------------|-------------------------|---------|-------|-------------------------|
| ?eak     | Peak             | Expected | Delta  |                 |                         | Conc.   |       |                         |
| No.      | RT               | RT       | RT     | Area            | Height                  | (ppb)   | Flags | Peak Identification     |
|          | 0.021            | =======  | ====== | =======         | =======                 |         | *==== |                         |
| 1<br>2   | 0.931<br>1.924   |          |        | 73856           | 7432                    |         |       |                         |
| 3        | 2.935            |          |        | 195<br>196      | 23<br>47                |         |       |                         |
| 4        | 3.500            |          |        | 4169            | 1246                    |         |       |                         |
| 5        | 3.839            |          |        | 2652            | 674                     |         |       |                         |
| 6        | 4.061            |          |        | 1429            | 383                     |         |       |                         |
| 7        | 4.602            |          |        | 995             | 177                     |         |       |                         |
| 8        | 5.386            | 5.391    | -0.004 | 1230086         | 387043                  | 101.804 | R     | Tetrachloro-meta-xylene |
| 9        | 5.852            |          |        | 886             | 174                     | •       | * *   |                         |
| 10       | 6.091            |          |        | 966             | 249                     |         |       |                         |
| 11       | 6.255            |          |        | 9261            | 3262                    |         |       |                         |
| 12       | 6.442            |          |        | 1684            | 552                     |         |       |                         |
| 13       | 6.586            | 6.592    | -0.007 | 315137          | 87494                   | 101.652 |       | BZ#8                    |
| 14       | 7.692            | 7.698    | -0.007 | 398309          | 100369                  | 101.899 |       | BZ#18                   |
| 15       | 8.015            |          |        | 2142            | 249                     |         |       |                         |
| 16       | 8.412            |          |        | 260             | 77                      |         |       |                         |
| 17       | 8.565            |          |        | 2685            | 831                     |         |       |                         |
| 18       | 8.798            |          |        | 448             | 133                     | 75      |       |                         |
| 19       | 9.130            | 9.137    | -0.007 | 665926          | 173210                  | 101.095 |       | BZ#28                   |
| 20       | 9.543            | 10 741   | 0.004  | 5988            | 804                     |         |       | ****                    |
| 21       | 10.336           | 10.341   | -0.004 | 528898          | 124213                  | 102.133 |       | BZ#52                   |
| 22<br>23 | 10.476<br>11.170 | 10.480   | -0.004 | 646690          | 141280                  | 101.394 |       | BZ#49                   |
| 24       | 11.307           | 11.312   | 0.004  | 748             | 135                     | 101 000 |       | 7.5%                    |
| 25       | 11.549           | 11.312   | -0.004 | 701437<br>12917 | 158622                  | 101.828 |       | BZ#44                   |
| 26       | 12.152           |          |        | 369             | 2037<br>91              | •       |       |                         |
| 27       | 12.345           |          |        | 391             | 101                     |         |       |                         |
| 28       | 12.451           |          |        | 454             | 110                     |         |       |                         |
| 29       | 12.600           |          |        | 1148            | 277                     |         |       |                         |
| 30       | 12.905           |          |        | 408             | 92                      |         |       |                         |
| 31       | 13.052           | 13.056   | -0.004 | 780696          | 162454                  | 99.9859 |       | BZ#66                   |
| 32       | 13.910           | 13.914   | -0.004 | 756505          | 150679                  | 101.830 |       | BZ#101                  |
| 33       | 14.883           |          |        | 2448            | 503                     |         |       |                         |
| 34       | 15.419           | 15.421   | -0.002 | 1645525         | 263128                  | 202.048 |       | BZ#81                   |
| 34       | 15.419           | 15.421   | -0.002 | 1645525         | 263128                  | 202.048 | М     | BZ#87                   |
| 35       | 16.071           | 16.080   | -0.009 | 543221          | 91982                   | 99.2336 |       | BZ#77                   |
| 36       | 16.669           |          |        | 6837            | 1040                    |         |       |                         |
| 37       | 16.944           | 16.946   | -0.002 | 837316          | 174308                  | 100.956 |       | BZ#123                  |
| 38       | 17.073           | 17.075   | -0.002 | 916480          | 167479                  | 100.612 |       | BZ#118                  |
| 39       | 17.649           | 17.656   | -0.007 | 1104668         | 234109                  | 100.179 |       | BZ#114                  |
| 40       | 17.798           | 17.802   | -0.004 | 999442          | 186931                  | 102.046 |       | BZ#184                  |
| 41       | 17.993           | 17.995   | -0.002 | 921512          | 170112                  | 102.118 |       | BZ#153                  |
| 42       | 18.285           |          |        | 5688            | 925                     |         |       |                         |
| 43       | 18.715           | 18.720   | -0.004 | 1026999         | 204453                  | 99.8791 | ••    | BZ#105                  |
| 44       | 19.190           |          |        | 9947            | 1464                    |         |       |                         |
| 45       | 19.711           | 19.713   | -0.002 | 1081863         | 205712                  | 102.193 |       | BZ#138                  |
| 46       | 20.003           | 20 225   | 0.00.  | 8084            | 1527                    |         |       |                         |
| 47       | 20.220           | 20.225   | -0.004 | 1615713         | 189311                  | 202.639 |       | BZ#126                  |
| 47       | 20.220           | 20.225   | -0.004 | 1615713         | 189311                  | 202.639 | М     | BZ#187                  |
| 48       | 20.484           | 20.489   | -0.004 | 1 146767        | 205341                  | 101.214 |       | BZ#183                  |
| 49       | 21.054           | 21.061   | -0.007 | 991190          | 178798                  | 100.727 |       | BZ#167                  |
| 50<br>51 | 21.460<br>22.036 | 21.462   | -0.002 | 1211187         | 230090                  | 102.073 |       | BZ#128                  |
| 52       | 22.036           |          |        | 887<br>272      | 195                     |         |       |                         |
| 53       | 22.253           | 22.464   | -0.007 |                 | 53<br>~~13167. <b>^</b> | 6 m #mc |       | 204156                  |
| در       | 46.33/           | 22.404   | -0.007 | 1163235         | T10101                  | 23.926  |       | BZ#156                  |

|    |     |        |          |        |         |        | Extract |       |         |                                         |
|----|-----|--------|----------|--------|---------|--------|---------|-------|---------|-----------------------------------------|
| Pe | ak  | Peak   | Expected | Delta  |         |        | Conc.   |       |         |                                         |
| N  | o.  | RT     | RT       | RT     | Area    | Height | (ppb)   | Flags |         | Peak Identification                     |
| == | === |        | =======  |        |         |        |         | ===== | ======= | *************************************** |
|    | 54  | 22.878 | 22.885   | -0.007 | 1139947 | 214633 | 99.4635 |       | BZ#157  |                                         |
|    | 55  | 23.109 | 23.115   | -0.007 | 1243944 | 228735 | 101.109 |       | BZ#180  |                                         |
|    | 56  | 24.454 | 24.461   | -0.007 | 888024  | 151041 | 99.0760 |       | BZ#169  |                                         |
| \$ | 57  | 24.674 | 24.678   | -0.004 | 1342083 | 241368 | 101.585 | R     | BZ#198  |                                         |
|    | 58  | 24.997 | 25.004   | -0.007 | 1290897 | 236160 | 100.713 |       | BZ#170  |                                         |
|    | 59  | 25.226 |          |        | 13349   | 2306   |         |       |         |                                         |
|    | 60  | 25.481 |          |        | 2195    | 211    |         |       |         |                                         |
|    | 61  | 25.837 |          |        | 1107    | 183    |         |       |         |                                         |
|    | 62  | 26.407 | 26.412   | -0.004 | 1285551 | 229338 | 99.5318 |       | BZ#189  |                                         |
|    | 63  | 27.196 | 27.203   | -0.007 | 1414572 | 248523 | 101.097 |       | BZ#195  |                                         |
|    | 64  | 28.302 |          |        | 10071   | 1973   |         |       |         |                                         |
|    | 65  | 28.814 |          |        | 308     | 68     |         |       |         |                                         |
|    | 66  | 29.510 |          |        | 387     | 63     |         |       |         |                                         |
|    | 67  | 29.801 | 29.805   | -0.004 | 1389845 | 286941 | 101.113 |       | BZ#206  |                                         |
|    | 68  | 30.747 | 30.754   | -0.007 | 1260755 | 273462 | 102.596 |       | BZ#209  |                                         |
|    | 69  | 32.175 |          |        | 1800    | 218    |         |       |         |                                         |
|    | 70  | 32.585 |          |        | 3369    | 301    |         |       |         |                                         |
|    | 71  | 33.334 |          |        | 19914   | 913    |         |       |         |                                         |
|    | 72  | 33.447 |          |        | 6011    | 925    |         |       |         |                                         |
|    | 73  | 33.758 |          |        | 3067    | 542    |         |       |         |                                         |
|    | 74  | 33.829 |          |        | 4733    | 704    |         |       |         |                                         |
|    | 75  | 34.520 |          |        | 2734    | 412    |         |       |         |                                         |
|    | 76  | 35.349 |          |        | 3679    | 395    |         |       |         |                                         |
|    | 77  | 35.832 |          |        | 1032    | 199    | • (44)  |       |         |                                         |
|    | 78  | 36.422 |          |        | 3194    | 592    | 7074    |       |         |                                         |
|    | 79  | 37.435 |          |        | 1611    | 210    |         |       |         |                                         |
|    |     |        |          |        |         |        |         |       |         |                                         |

Flags: A - Peak quantitates above calibration range

U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

| Target | t Compo | unds |
|--------|---------|------|
|        |         |      |

| Peak    | Expected             |                         |
|---------|----------------------|-------------------------|
| RT      | RT                   | Target Compound         |
| ======= | ======               |                         |
| 5.386   | 5.391                | Tetrachloro-meta-xylene |
| 6.586   | 6.592                | BZ#8                    |
| 7.692   | 7.698                | BZ#18                   |
| 9.130   | 9.137                | BZ#28                   |
| 10.336  | 10.341               | BZ#52                   |
| 10.476  | 10.480               | BZ#49                   |
| 11.307  | 11.312               | BZ#44                   |
| 13.052  | 13.056               | BZ#66                   |
| 13.910  | 13.914               | BZ#101                  |
| 15.419  | 15.421               | BZ#87                   |
| 15.419  | 15.421               | BZ#81                   |
| 16.071  | 16.080               | B2#77                   |
| 16.944  | 16.946               | BZ#123                  |
| 17.073  | 17.075               | BZ#118                  |
| 17.649  | 17.656               | BZ#114                  |
| 17.798  | 17.802               | BZ#184                  |
| 17.993  | 17.995               | BZ#153                  |
| 18.715  | 18.720               | BZ#105                  |
| 19.711  | 19.713               | BZ#138                  |
| 20.220  | 20.225               | BZ#126                  |
| 20.220  | 20.225               | BZ#187                  |
| 20.484  | 20.489               | BZ#183                  |
| 21.054  | [21 <sub>4</sub> 061 | BZ#167                  |
| 21.460  | 21.462               | BZ#128                  |
| 22.457  | 22.464               | BZ#156                  |
| 22.878  | 22.885               | BZ#157                  |
| 23.109  | 23.115               | BZ#180                  |
| 24.454  | 24.461               | BZ#169                  |
| 24.674  | 24.678               | BZ#1980240              |

a - Peak quantitates below reporting limit

H - User selected alternate compound hit

M - Peak manually integrated or manually identified R - Peak fails recovery

STL Burlington - Target GC Injection Report

| Peak   | Expected |                 |
|--------|----------|-----------------|
| RT     | RT       | Target Compound |
|        |          |                 |
| 24.997 | 25.004   | BZ#170          |
| 26.407 | 26.412   | BZ#189          |
| 27.196 | 27.203   | BZ#195          |
| 29.801 | 29.805   | BZ#206          |
| 30.747 | 30.754   | BZ#209          |

Client Sample ID: 32CONG-L5

Lab Sample ID: 32CONG-L5

| 0.3                                                      | 0,931)                                                                                   |                                                                                               |
|----------------------------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| 12.900)                                                  |                                                                                          |                                                                                               |
| 12:921<br>12:33:93<br>14:162<br>14:595)                  |                                                                                          | •                                                                                             |
| 76.091<br>\$76.43                                        | Tetrachioco seta sytana (5,384) 25,251) 3242 (4,561)                                     | Matrix Analyst Instrume Column Integrat Method Reported                                       |
| 49.162<br>103.408<br>103.794                             | P2040 47,600)                                                                            | Matrix Analyst Instrument Column Integrator Method Reported                                   |
| £9.53                                                    |                                                                                          |                                                                                               |
|                                                          | (1.844)                                                                                  | WALER 3327 2.i RTX-CLPII Falcon /var/chem, 17-Oct-20                                          |
| 12.8                                                     | 99)                                                                                      | WAIER 3327 2.i 3327 Z.i RTX-CLPII Falcon /var/chem/3327 17-Oct-2002 14                        |
| R15.1                                                    | .876)<br>122)                                                                            | 327_2.:<br>14:58                                                                              |
| 1                                                        | 16.665> 阿拉拉(5.38)                                                                        | 1/1                                                                                           |
| \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ | 9.179)                                                                                   | Injection Injection F Dilution F Data File Compound S 100302_1/03                             |
| ¥- [=                                                    | (19,999) P2122 (17,400 ) P2123 (17,400 ) P2124 (17,400 ) P2127 (21,400 ) P2129 (21,400 ) | Injection Date Injection Factor Dilution Factor Data File Compound Sublist 00302_1/030CT021 m |
| 23                                                       | 2.233}                                                                                   | 60 :: :: ::                                                                                   |
|                                                          | 25, 219)<br>(25, 470)                                                                    | 03-0<br>1.00<br>03oc<br>all<br>7.b/                                                           |
| 2, 2, 2, EIII AII A                                      | 25,924)  878183 (26,401)  828195 (27,192)                                                | CT-2002 21:40<br>t021607-r081.d<br>32CONG_3327RTXCLPII                                        |
| <b>∞</b> . ∀                                             |                                                                                          | 21:40<br>7-r081.<br>_3327RT                                                                   |
| 30 31                                                    | (30,375) 874909 (30,745)                                                                 | .d                                                                                            |
| 32<br>33                                                 | (31.765)<br>(32.170)<br>(32.572)                                                         | II_RAW.m                                                                                      |
| 34 35                                                    | (T34.511)                                                                                | V.m                                                                                           |
| ¥-                                                       | 5735,340)<br>735,824)<br>5736,415)                                                       |                                                                                               |
| 37 38                                                    | (37.428)                                                                                 |                                                                                               |
| 39                                                       | 0242                                                                                     |                                                                                               |

Y (x10^5)

Lab Sample ID: 32CONG-L5 Client Sample ID: 32CONG-L5

Matrix : WATER

Sample Type : CALIB\_5
Injection Date : 03-OCT-2002 21:40 Analyst m

Instrument : 3327 2.i Dilution Factor: 1.00

Column : RTX-CLPII Data File : 03oct021607-r081.d

Integrator : Falcon Compound Sublist: all

: /var/chem/3327\_2.i/100302\_1/03OCT021607.b/32CONG\_3327RTXCLPII\_RAW.m Method

Reported : 17-Oct-2002 09:13 rrm

|          |                  |                  | -                |                  | Pe             | aks      |       |                         |
|----------|------------------|------------------|------------------|------------------|----------------|----------|-------|-------------------------|
| Peak     | Peak             | Expected         | Delta            |                  |                | Extract  |       |                         |
| No.      | RT               | RT               | RT               | Area             | Height         | (ppb)    | Flags | Peak Identification     |
| 1        | 0.931            | =======          | ======           | 104206           | 11201          | ======== | ===== |                         |
| 2        | 1.900            |                  |                  | 104206           | 11201<br>33    |          |       |                         |
| 3        | 2.924            |                  |                  | 199              | 54             |          |       |                         |
| 4        | 3.112            |                  |                  | 258              | 75             |          |       |                         |
| 5        | 3.376            |                  |                  | 220              | 53             |          |       |                         |
| 6        | 3.498            |                  |                  | 8622             | 2539           |          |       |                         |
| 7        | 3.837            |                  |                  | 4706             | 1292           |          |       |                         |
| 8        | 4.059            |                  |                  | 1997             | 519            |          |       |                         |
| 9        | 4.152            |                  |                  | 2218             | 253            | * **     | 8 6   |                         |
| 10       | 4.595            |                  |                  | 888              | 138            |          |       |                         |
| 11       | 5.384            | 5.391            | -0.007           | 2515624          | 745379         | 195.470  | R     | Tetrachloro-meta-xylene |
| 12       | 6.091            |                  |                  | 1294             | 337            |          |       | • • •                   |
| 13       | 6.251            |                  |                  | 18932            | 6729           |          |       |                         |
| 14       | 6.437            | £ 500            |                  | 3390             | 1114           |          |       |                         |
| 15<br>16 | 6.581            | 6.592            | -0.011           | 614603           | 165840         | 193.948  |       | BZ#8                    |
| 17       | 7.690<br>8.162   | 7.698            | -0.009           | 750730           | 186298         | 191.436  |       | BZ#18                   |
| 18       | 8.408            |                  |                  | 1001             | 204            |          |       |                         |
| 19       | 8.563            |                  |                  | 505              | 154            |          |       |                         |
| 20       | 8.794            |                  |                  | 5407             | 1666           |          |       |                         |
| 21       | 9.128            | 9.137            | -0.009           | 974<br>1378570   | 283            | 300 400  |       |                         |
| 22       | 9.538            | 3.13,            | 0.005            | 8897             | 343465<br>936  | 199.413  |       | BZ#28                   |
| 23       | 10.332           | 10.341           | -0.009           | 997756           | 230838         | 101 212  |       | Pallan                  |
| 24       | 10.472           | 10.480           | -0.009           | 1256383          | 267450         | 191.713  |       | BZ#52                   |
| 25       | 11.163           |                  | 0.003            | 1432             | 283            | 193.447  |       | BZ#49                   |
| 26       | 11.303           | 11.312           | -0.009           | 1369755          | 301387         | 194.280  |       | BZ#44                   |
| 27       | 11.544           |                  |                  | 23865            | 3905           | 134.200  |       | D2#44                   |
| 28       | 12.152           |                  |                  | 705              | 171            |          |       |                         |
| 29       | 12.338           |                  |                  | 553              | 168            |          |       |                         |
| 30       | 12.447           |                  |                  | 606              | 179            |          |       |                         |
| 31       | 12.593           |                  |                  | 2331             | 567            |          |       |                         |
| 32       | 12.899           |                  |                  | 589              | 147            |          |       |                         |
| 33       | 13.045           | 13.056           | -0.011           | 1590569          | 330616         | 201.747  | A     | BZ#66                   |
| 34       | 13.905           | 13.914           | -0.009           | 1466726          | 284650         | 193.485  |       | BZ#101                  |
| 35       | 14.876           |                  |                  | 5188             | 1098           |          |       |                         |
| 36       | 15.122           |                  |                  | 546              | 110            |          |       |                         |
| 37       | 15.412           | 15.421           | -0.009           | 3244936          | 521982         | 398.267  |       | BZ#81                   |
| 37       | 15.412           | 15.421           | -0.009           | 3244936          | 521982         | 398.267  | М     | BZ#87                   |
| 38       | 16.062           | 16.080           | -0.018           | 1077416          | 190275         | 202.595  | A     | BZ#77                   |
| 39       | 16.665           | 16 246           |                  | 14475            | 2177           |          |       |                         |
| 40       | 16.935           | 16.946           | -0.011           | 1685349          | 345413         | 198.848  |       | BZ#123                  |
| 41<br>42 | 17.066           | 17.075           | -0.009           | 1842189          | 333214         | 199.185  |       | BZ#118                  |
| 43       | 17.645<br>17.793 | 17.656           | -0.011<br>-0.009 | 2360812          | 482348         | 203.684  |       | BZ#114                  |
| 44       | 17.793           | 17.802<br>17.995 | -0.009           | 1932489          | 352924         | 193.862  | · ·   | BZ#184                  |
| 45       | 18.283           | 17.773           | -0.009           | 1777800          | 321342         | 193.748  |       | BZ#153                  |
| 46       | 18.711           | 18.720           | -0.009           | 10331<br>2189449 | 1621           | 204 540  |       | DOM: A                  |
| 47       | 19.179           | 20.,20           | 0.009            | 8317             | 424839<br>1149 | 204.549  | A     | BZ#105                  |
| 48       | 19.704           | 19.713           | -0.009           | 2152226          | 394979         | 105 005  |       | D7#1.20                 |
| 49       | 19.999           |                  | 0.007            | 12775            | 2645           | 195.995  |       | BZ#138                  |
| 50       | 20.216           | 20.225           | ~0.009           | 3155673          | 361934         | 389.264  |       | P7#126                  |
| 50       | 20.216           | 20.225           | -0.009           | 3155673          | 361934         | 389.264  | м     | BZ#126                  |
| 51       | 20.480           | 20.489           | -0.009           | 2227579          | 396614         | 195.990  | 14    | BZ#187                  |
| 52       | 21.047           | 21.061           | -0.013           | 1972582          | 352446         | 197.870  |       | B2#183<br>B2#167        |
| 53       | 21.453           | 21.462           | -0.009           | 2455043          | ~447305        |          |       |                         |
|          |                  |                  | -                |                  |                | 2431     |       | BZ#128                  |

|       |        |          |         |         |         | Extract |       |                     |
|-------|--------|----------|---------|---------|---------|---------|-------|---------------------|
| Peak  | Peak   | Expected | Delta   |         |         | Conc.   |       |                     |
| No.   | RT     | RT       | RT      | Area    | Height  | (ppb)   | Flags | Peak Identification |
| ====  |        | =======  | ======= | ======= | ======= | ****    | ===== |                     |
| 54    | 22.031 |          |         | 1915    | 414     |         |       |                     |
| 55    | 22.233 |          |         | 1046    | 254     |         |       |                     |
| 56    | 22.450 | 22.464   | -0.013  | 2479381 | 456967  | 204.919 |       | BZ#156              |
| 57    | 22.872 | 22.885   | -0.013  | 2374945 | 442528  | 203.056 | A     | BZ#157              |
| 58    | 23.102 | 23.115   | -0.013  | 2497502 | 449485  | 198.260 |       | BZ#180              |
| 59    | 24.443 | 24.461   | -0.018  | 1808787 | 308920  | 201.496 | A     | BZ#169              |
| \$ 60 | 24.667 | 24.678   | -0.011  | 2676261 | 466213  | 196.364 | R     | BZ#198              |
| 61    | 24.991 | 25.004   | -0.013  | 2618461 | 466793  | 198.322 |       | BZ#170              |
| 62    | 25.219 |          |         | 24548   | 4362    |         |       |                     |
| 63    | 25.470 |          |         | 5472    | 554     |         |       |                     |
| 64    | 25.824 |          |         | 860     | 148     |         |       |                     |
| 65    | 26.401 | 26.412   | -0.011  | 2661819 | 467690  | 201.620 | A     | BZ#189              |
| 66    | 27.192 | 27.203   | -0.011  | 2847941 | 486905  | 197.685 |       | BZ#195              |
| 67    | 28.296 |          |         | 19884   | 3931    |         |       |                     |
| 68    | 28.810 |          |         | 313     | 69      |         |       |                     |
| 69    | 29.174 |          |         | 368     | 70      |         |       |                     |
| 70    | 29.491 |          |         | 1022    | 194     |         |       |                     |
| 71    | 29.796 | 29.805   | -0.009  | 2734894 | 552215  | 195.379 |       | BZ#206              |
| 72    | 30.375 |          |         | 5145    | 793     |         |       |                     |
| 73    | 30.745 | 30.754   | -0.009  | 2395709 | 507641  | 192.360 |       | BZ#209              |
| 74    | 31.765 |          |         | 478     | 115     |         |       |                     |
| 75    | 32.170 |          |         | 1580    | 333     |         |       |                     |
| 76    | 32.507 |          |         | 1493    | 202     |         |       |                     |
| 77    | 32.576 |          |         | 1785    | 416     |         |       |                     |
| 78    | 33.330 |          |         | 22671   | 1523    | • 14    | 1     |                     |
| 79    | 33.443 |          |         | 9065    | 1506    |         |       |                     |
| 80    | 33.753 |          |         | 3359    | 746     |         |       |                     |
| 81    | 33.824 |          |         | 7632    | 1019    |         |       |                     |
| 82    | 34.511 |          |         | 6132    | 521     |         |       |                     |
| 83    | 35.340 |          |         | 6139    | 680     |         |       |                     |
| 84    | 35.824 |          |         | 3006    | 331     |         |       |                     |
| 85    | 36.415 |          |         | 5824    | 1143    |         |       |                     |
| 86    | 37.428 |          |         | 2607    | 377     |         |       |                     |

Flags: A - Peak quantitates above calibration range

- a Peak quantitates below reporting limit H User selected alternate compound hit
- M Peak manually integrated or manually identified
- R Peak fails recovery
- U User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

| Target ( | compounds. |
|----------|------------|
|----------|------------|

| Peak   | Expected |                         |
|--------|----------|-------------------------|
| RT     | RT       | Target Compound         |
|        |          |                         |
| 5.384  | 5.391    | Tetrachloro-meta-xylene |
| 6.581  | 6.592    | B2#8                    |
| 7.690  | 7.698    | BZ#18                   |
| 9.128  | 9.137    | BZ#28                   |
| 10.332 | 10.341   | BZ#52                   |
| 10.472 | 10.480   | BZ#49                   |
| 11.303 | 11.312   | BZ#44                   |
| 13.045 | 13.056   | BZ#66                   |
| 13.905 | 13.914   | BZ#101                  |
| 15.412 | 15.421   | BZ#87                   |
| 15.412 | 15.421   | BZ#81                   |
| 16.062 | 16.080   | BZ#77                   |
| 16.935 | 16.946   | BZ#123                  |
| 17.066 | 17.075   | BZ#118                  |
| 17.645 | 17.656   | BZ#114                  |
| 17.793 | 174.802  | BZ#184                  |
| 17.986 | 17.995   | BZ#153                  |
| 18.711 | 18.720   | BZ#105                  |
| 19.704 | 19.713   | BZ#138                  |
| 20.216 | 20.225   | BZ#126                  |
| 20.216 | 20.225   | ~BZ#187 C A A           |
| 20.480 | 20.489   | BZ#183U Z 4 4           |

STL Burlington - Target GC Injection Report

| Peak   | Expected |                 |
|--------|----------|-----------------|
| RT     | RT       | Target Compound |
| ====== | =======  |                 |
| 21.047 | 21.061   | BZ#167          |
| 21.453 | 21.462   | BZ#128          |
| 22.450 | 22.464   | BZ#156          |
| 22.872 | 22.885   | BZ#157          |
| 23.102 | 23.115   | BZ#180          |
| 24.443 | 24.461   | BZ#169          |
| 24.667 | 24.678   | BZ#198          |
| 24.991 | 25.004   | BZ#170          |
| 26.401 | 26.412   | BZ#189          |
| 27.192 | 27.203   | BZ#195          |
| 29.796 | 29.805   | BZ#206          |
| 30.745 | 30.754   | BZ#209          |

|                                         |                | Y (x10^5)    |                  |                   |                       |                           |
|-----------------------------------------|----------------|--------------|------------------|-------------------|-----------------------|---------------------------|
| \$ 0<br>4 0                             | 0.6            |              | 4<br>4<br>4<br>1 | 1.3               | 1.4 5                 | . 6,<br>1,                |
| (0,953)                                 |                |              |                  |                   |                       |                           |
| 1.379)                                  |                |              |                  |                   |                       |                           |
| 1,891>                                  |                |              |                  |                   |                       |                           |
| 3: <u>172)</u><br>3: 3502)              |                |              |                  |                   |                       |                           |
| (3.902)<br>⊒.841)                       |                |              |                  |                   |                       |                           |
| 3.841)<br>5.263<br>4.061)<br>3.637)     |                |              |                  |                   |                       |                           |
| 5.023)                                  |                |              |                  |                   | - Tetrochiero neto    | inglene (5.2)             |
| (5,577)<br>5,856)<br>(6,025)<br>(6,255) |                |              |                  |                   |                       | . •                       |
| (6,200)                                 | BZ#8 (6.58     | 8>           |                  |                   |                       |                           |
| -                                       | B74            | 18 (7.694)   |                  |                   |                       |                           |
| -                                       | B2.0           | *******      |                  |                   |                       |                           |
| (8,565)<br>                             |                |              | BZ#28            | (9,130)           |                       |                           |
| (9,541)                                 |                |              |                  |                   |                       |                           |
|                                         | <del></del>    | BZ#52 (10.   | 336>             |                   |                       |                           |
|                                         |                |              | BZ#44 (11        | 305)              |                       |                           |
| <del>-</del>                            |                |              |                  |                   |                       |                           |
|                                         |                | _            | 78// /47         |                   |                       |                           |
|                                         |                | В            | Z#66 (13.050)    |                   |                       |                           |
|                                         |                |              | BZ#101 (13,      | .907)             |                       |                           |
| 715,129)                                |                |              |                  |                   | § =                   |                           |
| (15.408)<br>(15.639)                    |                |              |                  |                   |                       |                           |
| (16.667)                                | BZ#77 (16.077) |              |                  |                   |                       |                           |
| (16.913)                                |                | BZ#1         | 18 (17.073)      |                   |                       |                           |
| (17.689)                                |                |              | BZ1              | 153 (17.988)      |                       |                           |
| <u> </u>                                |                |              | В                | Z#105 (18,715)    |                       |                           |
| S(19,201)                               |                |              |                  | 8744              | 38 (19 706)           |                           |
| £(19,999)                               |                |              |                  | BZ#1<br>BZ#126 <2 | 38 (19,706)<br>0,216) |                           |
| \$(19,201)<br>\$(19,999)                |                |              |                  |                   |                       |                           |
| (21.056)                                | <del></del>    |              |                  |                   | BZ#128 (2             | 1.455>                    |
| (121:897)<br>(122:300)                  |                |              |                  |                   |                       |                           |
| (22,878)                                |                |              |                  |                   | BZ#180 (23.107)       | ,                         |
| F                                       |                |              |                  |                   |                       |                           |
| (21:131)                                |                |              |                  |                   | В                     | Z#198 (24.66              |
|                                         |                |              |                  |                   |                       | 0 (24.995)                |
| (25,842)                                |                |              |                  |                   |                       |                           |
| (76: <del>953</del> )                   |                |              |                  |                   |                       |                           |
|                                         |                | ···········  | <del></del>      |                   | BZI                   | 1195 (27.196)             |
| 128.016)<br>5(28.302)                   |                |              |                  |                   |                       |                           |
| (28.812)                                |                |              |                  |                   |                       |                           |
| <u> </u>                                |                |              |                  | ···               |                       | D24206-(29 <sub>4</sub> 7 |
|                                         |                |              |                  |                   |                       | D3#200 (21 =              |
| E                                       |                |              |                  |                   |                       | DZ#209 - (30.7            |
| (31.539)<br>(31.776)                    |                |              |                  |                   |                       |                           |
| (32,173)                                |                |              |                  |                   |                       |                           |
| \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\  |                |              |                  |                   |                       |                           |
| 1                                       |                |              |                  |                   | <del>ta</del>         |                           |
| QC34.108>                               |                |              |                  |                   |                       |                           |
| 1                                       |                |              |                  |                   |                       |                           |
| 0034.108>                               |                |              |                  |                   |                       |                           |
| (34,622                                 |                |              |                  |                   |                       |                           |
| (34,622                                 |                | 1 4          |                  |                   |                       |                           |
| (34.622<br>(34.622<br>(35.338)          |                | 4            |                  |                   |                       |                           |
| (34,622                                 |                | 1            |                  |                   |                       |                           |
| (34,622<br>(34,622<br>(35,338)          |                | 4            |                  |                   |                       |                           |
| (34,622<br>(34,622<br>(35,338)          |                | s <b>} ⁴</b> |                  |                   | 2                     |                           |
| (34.622<br>(34.622<br>(35.338)          |                | ±} <b>4</b>  |                  | 024               | 6                     |                           |

| Reported                | Method                                                                | Integrator              | Column                         | Instrument             | Analyst                            | Matrix                 | Lab Sample ID: 20ICV-50    |
|-------------------------|-----------------------------------------------------------------------|-------------------------|--------------------------------|------------------------|------------------------------------|------------------------|----------------------------|
| <br>ப                   |                                                                       | <br>H                   | <br>51                         | ٠٠                     | ••                                 |                        | D: 2                       |
| : 17-Oct-2002 14:58 rrm | /var/chem/3327_2.:                                                    | Falcon                  | RTX-CLPII                      | 3327_2.i               |                                    | WATER                  | 20ICV-50                   |
| rrm                     | : /var/chem/3327_2.i/100302_1/030CT021607.b/32CONG_3327RTXCLPII_RAW.m | Compound Sublist: 20ICV | Data File : 03oct021607-r101.d | Dilution Factor : 1.00 | Injection Date : 03-OCT-2002 23:10 | Sample Type : CCALIB_6 | Client Sample ID: 20ICV-50 |

# STL Burlington - Target GC Injection Report

|       |        |          |         |        |        | Extract  |       |        |                     |
|-------|--------|----------|---------|--------|--------|----------|-------|--------|---------------------|
| Peak  | Peak   | Expected | Delta   |        |        | Conc.    |       |        |                     |
| No.   | RT     | RT       | RT      | Area   | Height | (ppb)    | Flags |        | Peak Identification |
| ===== |        | =======  | ======= |        |        | ======== |       |        |                     |
| 55    | 24.995 | 25.004   | -0.009  | 623841 | 114094 | 49.0528  |       | BZ#170 |                     |
| 56    | 25.842 |          |         | 1099   | 157    |          |       |        |                     |
| 57    | 26.412 |          |         | 601    | 129    |          |       |        |                     |
| 58    | 26.553 |          |         | 1762   | 320    |          |       |        | <u> </u>            |
| 59    | 27.196 | 27.203   | -0.007  | 652631 | 116216 | 47.4886  |       | BZ#195 |                     |
| 60    | 28.016 |          |         | 575    | 123    |          |       |        |                     |
| 61    | 28.302 |          |         | 5676   | 1121   |          |       |        |                     |
| 62    | 28.812 |          |         | 1176   | 166    |          |       |        |                     |
| 63    | 29.799 | 29.805   | -0.007  | 677240 | 146523 | 51.2146  | М     | BZ#206 |                     |
| 64    | 30.747 | 30.754   | -0.007  | 612227 | 138573 | 50.8907  |       | BZ#209 |                     |
| 65    | 31.539 |          |         | 296    | 73     |          |       |        |                     |
| 66    | 31.776 |          |         | 255    | 25     |          |       |        |                     |
| 67    | 32.173 |          |         | 2123   | 378    |          |       |        |                     |
| 68    | 32.889 |          |         | 19717  | 1399   |          |       |        |                     |
| 69    | 33.099 |          |         | 11017  | 1221   |          |       |        |                     |
| 70    | 33.332 |          |         | 8199   | 790    |          |       |        |                     |
| 71    | 34.108 |          |         | 3966   | 505    |          |       |        |                     |
| 72    | 34.622 |          |         | 29217  | 4213   |          |       |        |                     |
| 73    | 35.345 |          |         | 1210   | 207    |          |       |        |                     |
| 74    | 35.538 |          |         | 5290   | 928    |          |       |        |                     |
| 75    | 37.874 |          |         | 1035   | 158    |          |       |        |                     |

Flags: A - Peak quantitates above calibration range

a - Peak quantitates below reporting limit

H - User selected alternate compound hit

 $\ensuremath{\mathrm{M}}$  - Peak manually integrated or manually identified

R - Peak fails recovery

 ${\tt U}$  - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

| Taro | ret | Compo | nnde  |
|------|-----|-------|-------|
| 1414 |     | COMBO | ullus |

| Peak   | Expected |                         |
|--------|----------|-------------------------|
| RT     | ŔŦ       | Target Compound         |
|        | =======  |                         |
| 5.389  | 5.391    | Tetrachloro-meta-xylene |
| 6.588  | 6.592    | BZ#8                    |
| 7.694  | 7.698    | BZ#18                   |
| 9.130  | 9.137    | BZ#28                   |
| 10.336 | 10.341   | BZ#52                   |
| 11.305 | 11.312   | BZ#44                   |
| 13.050 | 13.056   | BZ#66                   |
| 13.907 | 13.914   | BZ#101                  |
| 16.077 | 16.080   | BZ#77                   |
| 17.073 | 17.075   | BZ#118                  |
| 17.988 | 17.995   | BZ#153                  |
| 18.715 | 18.720   | BZ#105                  |
| 19.706 | 19.713   | BZ#138                  |
| 20.216 | 20.225   | BZ#126                  |
| 20.216 | 20.225   | BZ#187                  |
| 21.455 | 21.462   | BZ#128                  |
| 23.107 | 23.115   | BZ#180                  |
| 24.669 | 24.678   | BZ#198                  |
| 24.995 | 25.004   | BZ#170                  |
| 27.196 | 27.203   | BZ#195                  |
| 29.799 | 29.805   | BZ#206                  |
| 30.747 | 30.754   | BZ#209                  |
|        |          |                         |

Lab Sample ID: 20ICV-50 Client Sample ID: 20ICV-50

: WATER Matrix Sample Type : CCALIB 6

Analyst Injection Date : 03-OCT-2002 23:10

: 3327\_2.i Instrument Dilution Factor: 1.00

: RTX-CLPII Column Data File : 03oct021607-r101.d

Integrator : Falcon Compound Sublist: 20ICV

: /var/chem/3327\_2.i/100302\_1/030CT021607.b/32CONG\_3327RTXCLPII\_RAW.m Method

: 17-Oct-2002 09:13 rrm Reported

|      |        | . <u></u> | - 0     |        | Pe     | aks              |       |                         |
|------|--------|-----------|---------|--------|--------|------------------|-------|-------------------------|
| Peak | Peak   | Expected  | Delta   |        |        | Extract<br>Conc. |       |                         |
| No.  | RT     | RT        | RT      | Area   | Height | (ppb)            | Flags | Peak Identification     |
|      |        | =======   | ======= |        |        | ========         |       |                         |
| 1    | 0.953  |           |         | 85728  | 7565   |                  |       |                         |
| 2    | 1.379  |           |         | 5096   | 641    |                  |       |                         |
| 3    | 1.891  |           |         | 191    | 40     |                  |       |                         |
| 4    | 2.924  |           |         | 876    | 153    |                  |       |                         |
| 5    | 3.112  |           |         | 865    | 170    |                  |       |                         |
| 6    | 3.354  |           |         | 682    | 140    |                  |       |                         |
| 7    | 3.502  |           |         | 1870   | 588    |                  |       |                         |
| 8    | 3.841  |           |         | 1376   | 357    | 0.000            |       |                         |
| 9    | 4.061  |           |         | 19208  | 6292   | ***              | 28 33 |                         |
| 10   | 4.263  |           |         | 2297   | 424    |                  |       |                         |
| 11   | 4.420  |           |         | 868    | 186    |                  |       |                         |
| 12   | 4.593  |           |         | 1086   | 218    |                  |       |                         |
| 13   | 4.697  |           |         | 5998   | 2020   |                  |       |                         |
| 14   | 5.023  |           |         | 227    | 76     |                  |       |                         |
| 15   | 5.389  | 5.391     | -0.002  | 541839 | 183402 | 48.5737          | R     | Tetrachloro-meta-xylene |
| 16   | 5.577  |           |         | 5664   | 1257   |                  |       |                         |
| 17   | 5.856  |           |         | 1515   | 194    |                  |       |                         |
| 18   | 6.025  |           |         | 4441   | 1303   |                  |       |                         |
| 19   | 6.255  |           |         | 4488   | 1556   |                  |       |                         |
| 20   | 6.588  | 6.592     | -0.004  | 154268 | 43801  | 50.1788          |       | BZ#8                    |
| 21   | 7.694  | 7.698     | -0.004  | 197373 | 51168  | 50.6319          |       | BZ#18                   |
| 22   | 8.565  |           |         | 1280   | 388    |                  |       |                         |
| 23   | 9.130  | 9.137     | -0.007  | 305759 | 81288  | 48.0128          |       | BZ#28                   |
| 24   | 9.541  |           |         | 6502   | 998    |                  |       |                         |
| 25   | 10.336 | 10.341    | -0.004  | 281190 | 64035  | 51.5754          |       | B2#52                   |
| 26   | 11.305 | 11.312    | -0.007  | 348745 | 78640  | 50.0329          |       | BZ#44                   |
| 27   | 13.050 | 13.056    | -0.007  | 360942 | 73234  | 45.9956          |       | BZ#66                   |
| 28   | 13.907 | 13.914    | -0.007  | 382529 | 76557  | 51.1199          |       | BZ#101                  |
| 29   | 15.129 |           |         | 602    | 143    |                  |       |                         |
| 30   | 15.408 |           |         | 4327   | 652    |                  |       |                         |
| 31   | 15.639 |           |         | 1455   | 306    |                  |       |                         |
| 32   | 16.077 | 16.080    | -0.002  | 254670 | 35218  | 39.5427          |       | BZ#77                   |
| 33   | 16.667 |           |         | 5274   | 754    |                  |       |                         |
| 34   | 16.913 |           |         | 3827   | 402    |                  |       |                         |
| 35   | 17.073 | 17.075    | -0.002  | 390557 | 69406  | 42.2826          |       | BZ#118                  |
| 36   | 17.689 |           |         | 10639  | 1697   |                  |       |                         |
| 37   | 17.988 | 17.995    | -0.007  | 451620 | 83865  | 49.8612          |       | BZ#153                  |
| 38   | 18.715 |           | -0.004  | 453974 | 85202  | 43.2423          | M     | BZ#105                  |
| 39   | 19.201 |           |         | 17681  | 1970   | -21-1-5          |       | i · ·                   |
| 40   | 19.706 | 19.713    | -0.007  | 505457 | 96331  | 47.9827          | М     | BZ#138                  |
| 41   | 19.999 |           |         | 4483   | 822    | 5027             |       | <del>_</del>            |
| 42   | 20.216 |           | -0.009  | 836631 | 91003  | 96.3562          | м     | BZ#126                  |
| 42   | 20.216 |           | -0.009  | 836631 | 91003  | 96.3562          |       | BZ#120<br>BZ#187        |
| 43   | 21.056 |           | 3.009   | 2789   | 301    | 20.3302          | 1227  | n                       |
| 44   | 21.455 |           | -0.007  | 574740 | 110133 | 49.3676          | м     | BZ#128                  |
| 45   | 21.433 |           | -0.007  |        |        | 72.30/6          | (r)   | 11 1 1 2 C              |
|      | 22.036 |           |         | 1876   | 308    |                  |       |                         |
| 46   |        |           |         | 1789   | 292    |                  |       |                         |
| 47   | 22.300 |           |         | 896    | 137    |                  |       |                         |
| 48   | 22.468 |           |         | 3833   | 562    |                  |       |                         |
| 49   | 22.878 |           |         | 3364   | 521    |                  |       | 771700                  |
| 50   | 23.107 |           | -0.009  | 564561 | 104026 | 46.2252          |       | BZ#180                  |
| 51   | 24.131 |           |         | 868    | 172    |                  |       |                         |
| 52   | 24.321 |           |         | 1769   | 305    |                  |       |                         |
| 53   | 24.465 |           |         | 513    | 110    |                  |       |                         |
| 54   | 24.669 | 24.678    | -0.009  | 636553 | 118010 | 49.5852          | R     | BZ#198                  |

Client Sample

ID: 32CONG-L3

Lab Sample ID: 32CONG-L3

| 4 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0 0 8 yay sag  | 1.0               | 1.2            | <u>р</u> р                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ا مر                                                     |                                                            |                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|------------------------------------------------------------|----------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | P. 7 P         |                   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1.6                                                      |                                                            |                                                                      |
| (0.000)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                |                   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | = 1                                                      |                                                            |                                                                      |
| (0.920)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                |                   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                          |                                                            |                                                                      |
| 1,904)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |                   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 225                                                      |                                                            |                                                                      |
| 2,933>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |                   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | = -                                                      |                                                            |                                                                      |
| ₹ <b>.363</b> }                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |                   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                          |                                                            |                                                                      |
| 3,830)<br>(4,050)<br>(4,65)<br>(4,65)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                |                   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                          |                                                            |                                                                      |
| 5.012)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |                   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                          |                                                            |                                                                      |
| 75,564)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                |                   |                | Tetrechlore neta-nyi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ene (5,376)                                              |                                                            |                                                                      |
| (5,564)<br>Re (42)<br>(6,426)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                |                   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                          | Column Integrator Method Reported                          | Instrument                                                           |
| 6.426)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | BZ#8 (6,572)   |                   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                          | lu<br>te<br>po                                             | Ct F                                                                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | P7#40          | (7,679)           |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                          | tt<br>ga<br>mm                                             | Instrum                                                              |
| 8,182>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                | (7,677)           |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                          | e d                                                        | me                                                                   |
| <u>(</u> 8,550)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |                   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                          | , of                                                       | ä                                                                    |
| (9,527)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                |                   | -BZ#28 (9,115) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | =                                                        | .,                                                         | •                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                | BZ#52 (10, 319) ( |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                          |                                                            |                                                                      |
| -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                | BZ#49 (           | 10,458)        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                          |                                                            |                                                                      |
| (11,531)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                |                   | BZ#44 (11,289) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                          | RT<br>V                                                    | ω                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |                   | 36             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                          | -0' Jr.                                                    | 27                                                                   |
| 12.577)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                | B7#//             | 6 (13.034)     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                          | 5 6 8 E                                                    | 2                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |                   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                          | RTX-CLPII Falcon /var/chem/3 17-Oct-2002                   | µ.                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |                   | 101 (13,890)   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                          | m/                                                         |                                                                      |
| <u>(1</u> 4,867)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                |                   |                | • • (00) 50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                          | ω ω                                                        |                                                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |                   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <del>01 (1</del> 5.397)                                  | 327                                                        |                                                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | BZ#77 (16,058) |                   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                          | :12                                                        |                                                                      |
| (16.647)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                |                   |                | •                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                          | σ.                                                         |                                                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |                   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | , <sub>∓</sub>                                           | , t                                                        |                                                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |                   | BZ#153 (17.    | 184 (17. <mark>77/9)</mark> 4 (17.629                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | HultiChrom                                               | 710<br>710<br>01/                                          | U F                                                                  |
| <u> </u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                |                   | BZ#10          | (18,695)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 8                                                        | Data<br>Compo<br>.00302<br>m                               | 15                                                                   |
| (19,172)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                |                   |                | BZ#138 (19,686)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 8                                                        | а<br>02                                                    | nt<br>ec                                                             |
| £19,979)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                |                   | BZ             | #126 (20,196)<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 03                                                       | File<br>bund :<br>2_1/0:                                   | ) <u> </u>                                                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |                   | BZ#167 (       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 803                                                      | ld /c                                                      | ğğ                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |                   |                | BZ#128 (                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 21.433)                                                  | L. 20                                                      |                                                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |                   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <u>&amp;</u>                                             | 20 00                                                      | ਲ ⊢                                                                  |
| (21,874)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                |                   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 08.113                                                   | 30C1                                                       | Pact                                                                 |
| 121,874)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                |                   |                | —BZ#156 (22,433)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 8. i131                                                  | Subli:                                                     | Date<br>Facto:                                                       |
| (21.874)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                |                   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 23,082)                                                  | Sublist<br>30CT021                                         | Pactor                                                               |
| (21.874)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                | 8261              | 69 (24,428)    | —BZ#156 (22,433)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 23.082>                                                  | 0,                                                         |                                                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                | - 82 <b>8</b> 1   | .69 (24.428)   | — BZ#156 (22,433)<br>— BZ#157 (22,852)<br>— BZ#160 (;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 23.082)<br>26. (24.643)<br>70. (24.969)                  | 508.                                                       | . 04                                                                 |
| (21.674)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                | BZ#1              | .69 (24,428)   | — BZ#156 (22,433)<br>— BZ#157 (22,852)<br>— BZ#160 (;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 23,082)                                                  | 508.                                                       | . 04<br>. 1                                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                | 8281              | .69 (24,428)   | — BZ#156 (22,433)<br>— BZ#157 (22,852)<br>- BZ#180 (;<br>- BZ#17                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 23.082)<br>9 <del>0.</del> (24.643)<br>70 (24.969)       | 508.                                                       | . 04                                                                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                | 8281              | .69 (24.428)   | —BZ#156 (22,433) —BZ#157 (22,852) . —BZ#160 (; . —BZ#189                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 23,082)<br>90-(24,643)<br>90-(24,969)<br>(26,378)        | 508.                                                       | . 04                                                                 |
| (25,195)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                | - BZ#1            | .69 (24,428)   | —BZ#156 (22,433) —BZ#157 (22,852) . —BZ#160 (; . —BZ#189                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 23.082)<br>9 <del>0.</del> (24.643)<br>70 (24.969)       | 508.                                                       | . 04                                                                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                | 3291              | .69 (24,428)   | —BZ#156 (22,433) —BZ#157 (22,852) . —BZ#160 (; . —BZ#189                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 23,082)<br>90-(24,643)<br>90-(24,969)<br>(26,378)        | : 03oct02160<br>: all<br>: all<br>: all                    | . 04                                                                 |
| (25,195)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                | - BZ\$1           | .69 (24,428)   | —BZ#156 (22,433) —BZ#157 (22,852) . —BZ#160 (; . —BZ#189                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 23,082)<br>90-(24,643)<br>90-(24,969)<br>(26,378)        | : 03oct02160<br>: all<br>: all<br>: all                    | . 04                                                                 |
| 7725,195)<br>(727,985)<br>5(28,276)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                | 8281              | .69 (24,428)   | — BZ#156 (22,433)  — BZ#157 (22,852)  — BZ#158 (22,436) (;  — BZ#169 (22,436) (22,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,43 | 23,082)  90-(24,643) 70 (24,569)  (26,378)  16-427,165)  | : 03oct02160<br>: all<br>: all<br>: all                    | . 04                                                                 |
| (727,985)<br>5(28,276)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                | 8281              | .69 (24,428)   | —BZ#156 (22,433) —BZ#157 (22,852) . —BZ#160 (; . —BZ#189                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 23,082)  90-(24,643) 70 (24,569)  (26,378)  16-427,165)  | : 03oct02160<br>: all<br>: all<br>: all                    | . 04                                                                 |
| (727,985)<br>5(28,276)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |                   | .69 (24.428)   | — BZ#156 (22,433)  — BZ#157 (22,852)  — BZ#158 (22,436) (;  — BZ#169 (22,436) (22,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,436) (23,43 | 23,082)  98- (24,643) 70 (24,969)  (26,378)  6- (27,165) | : 03oct02160<br>: all<br>: all<br>: all                    |                                                                      |
| (727,985)<br>5(28,276)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |                   | .69 (24.428)   | BZ#156 (22,433)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 23,082)  98- (24,643) 70 (24,969)  (26,378)  6- (27,165) | : 03oct02160<br>: all<br>: all<br>: all                    |                                                                      |
| (727,985)<br>5(28,276)<br>(28,843)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                |                   | .69 (24,428)   | BZ#156 (22,433)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 23,082)  98- (24,643) 70 (24,969)  (26,378)  6- (27,165) | : 03oct02160<br>: all<br>: all<br>: all                    |                                                                      |
| (22,168)<br>(22,576)<br>(23,576)<br>(23,576)<br>(23,576)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                | B261              | .69 (24,428)   | BZ#156 (22,433)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 23,082)  98- (24,643) 70 (24,969)  (26,378)  6- (27,165) | : 03oct021608-r131.d<br>: a11<br>508.b/32CONG_3327RTXCLPII |                                                                      |
| (727, 985)<br>5(28, 276)<br>(28, 276)<br>(28, 843)<br>(32, 168)<br>(22, 576)<br>(33, 186)<br>(33, 186)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                | B261              | .69 (24,428)   | BZ#156 (22,433)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 23,082)  98- (24,643) 70 (24,969)  (26,378)  6- (27,165) | : 03oct021608-r131.d<br>: a11<br>508.b/32CONG_3327RTXCLPII |                                                                      |
| (22,168)<br>(22,168)<br>(22,276)<br>(22,276)<br>(23,276)<br>(23,376)<br>(23,376)<br>(23,376)<br>(23,376)<br>(23,376)<br>(23,376)<br>(23,376)<br>(23,376)<br>(23,376)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                | 3261              | .69 (24.428)   | BZ#156 (22,433)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 23,082)  98- (24,643) 70 (24,969)  (26,378)  6- (27,165) | : 03oct021608-r131.d<br>: all<br>: all                     | . 04                                                                 |
| (32,168)<br>(22,576)<br>(32,576)<br>(32,168)<br>(32,576)<br>(33,673)<br>(33,673)<br>(33,673)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                | 3261              | .69 (24.428)   | BZ#156 (22,433)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 23,082)  98- (24,643) 70 (24,969)  (26,378)  6- (27,165) | : 03oct021608-r131.d<br>: a11<br>508.b/32CONG_3327RTXCLPII | . 04                                                                 |
| (22,168)<br>(22,168)<br>(22,276)<br>(22,276)<br>(23,276)<br>(23,376)<br>(23,376)<br>(23,376)<br>(23,376)<br>(23,376)<br>(23,376)<br>(23,376)<br>(23,376)<br>(23,376)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                | 8281              | .69 (24.428)   | BZ#156 (22,433)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 23,082)  98- (24,643) 70 (24,969)  (26,378)  6- (27,165) | : 03oct021608-r131.d<br>: all<br>: all                     | . 04                                                                 |
| (22,168)<br>(22,276)<br>(28,276)<br>(28,276)<br>(22,576)<br>(23,576)<br>(23,576)<br>(23,576)<br>(23,576)<br>(23,576)<br>(23,576)<br>(23,576)<br>(23,576)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                | 8281              | .69 (24.428)   | BZ#156 (22,433)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 23,082)  98- (24,643) 70 (24,969)  (26,378)  6- (27,165) | : 03oct021608-r131.d<br>: all<br>: all                     | . 04                                                                 |
| (22, 195)<br>(27, 985)<br>5(28, 276)<br>(28, 843)<br>(22, 576)<br>(32, 168)<br>(32, 168)<br>(32, 168)<br>(32, 168)<br>(33, 169)<br>(34, 168)<br>(34, 168)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                |                   | .69 (24.428)   | BZ#156 (22,433)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 23,082)  98- (24,643) 70 (24,969)  (26,378)  6- (27,165) | : 03oct021608-r131.d<br>: all<br>: all                     | . 04<br>. 1                                                          |
| (22,168)<br>(22,276)<br>(28,276)<br>(28,276)<br>(22,576)<br>(23,576)<br>(23,576)<br>(23,576)<br>(23,576)<br>(23,576)<br>(23,576)<br>(23,576)<br>(23,576)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                | 8281              | .69 (24.428)   | BZ#156 (22,433)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 23,082)  98- (24,643) 70 (24,969)  (26,378)  6- (27,165) | : 03oct021608-r131.d<br>: all<br>: all                     | . 04<br>. 1                                                          |
| (22,168)<br>(22,276)<br>(28,276)<br>(28,276)<br>(22,576)<br>(23,576)<br>(23,576)<br>(23,576)<br>(23,576)<br>(23,576)<br>(23,576)<br>(23,576)<br>(23,576)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                |                   | .69 (24.428)   | BZ#156 (22,433)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 23,082)  98- (24,643) 70 (24,969)  (26,378)  6- (27,165) | : 03oct021608-r131.d<br>: all<br>: all                     | . 04<br>. 1                                                          |
| (32,168)<br>(22,576)<br>(22,576)<br>(23,843)<br>(22,576)<br>(23,345)<br>(23,345)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23 |                |                   | .69 (24.428)   | BZ#156 (22,433)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 23,082)  98- (24,643) 70 (24,969)  (26,378)  6- (27,165) | : 03oct021608-r131.d<br>: all<br>: all                     | . 04<br>. 1                                                          |
| (32,168)<br>(22,576)<br>(22,576)<br>(23,843)<br>(22,576)<br>(23,345)<br>(23,345)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23 |                |                   |                | BZ#156 (22,433)  BZ#157 (22,852)  BZ#150 (2,433)  BZ#150 (2,433)  BZ#150 (2,433)  BZ#150 (2,433)  BZ#150 (2,433)  BZ#150 (2,433)  BZ#150 (2,433)  BZ#150 (2,433)  BZ#150 (2,433)  BZ#150 (2,433)  BZ#150 (2,433)  BZ#150 (2,433)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 23,082)  98- (24,643) 70 (24,969)  (26,378)  6- (27,165) | : 03oct021608-r131.d<br>: all<br>: all                     | <br>1.                                                               |
| (32,168)<br>(22,576)<br>(22,576)<br>(23,843)<br>(22,576)<br>(23,345)<br>(23,345)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23,080)<br>(23 |                |                   | 0248           | BZ#156 (22,433)  BZ#157 (22,852)  BZ#150 (2,433)  BZ#150 (2,433)  BZ#150 (2,433)  BZ#150 (2,433)  BZ#150 (2,433)  BZ#150 (2,433)  BZ#150 (2,433)  BZ#150 (2,433)  BZ#150 (2,433)  BZ#150 (2,433)  BZ#150 (2,433)  BZ#150 (2,433)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 23,082)  98- (24,643) 70 (24,969)  (26,378)  6- (27,165) | : 03oct021608-r131.d<br>: all<br>: all                     | <pre>injection Date : 04-OCT-2002 08:55 Dilution Factor : 1.00</pre> |

Lab Sample ID: 32CONG-L3 Client Sample ID: 32CONG-L3

: CCALIB\_3 Matrix : WATER Sample Type

: pw : 3327\_2.i Injection Date : 04-OCT-2002 08:55 Analyst

Dilution Factor: 1.00 Instrument

: 03oct021608-r131.d : RTX-CLPII Column Data File

: Falcon Compound Sublist: all Integrator

: /var/chem/3327\_2.i/100302\_1/030CT021608.b/32CONG\_3327RTXCLPII\_RAW.m Method

Peaks

Reported : 17-Oct-2002 09:55 rrm

| Pea |                | Peak<br>RT     | Expected<br>RT | Delta<br>RT | Area         | Height     | Extract<br>Conc.<br>(ppb) | Flags  | Peak Identific          | ation     |
|-----|----------------|----------------|----------------|-------------|--------------|------------|---------------------------|--------|-------------------------|-----------|
|     |                |                |                | ==          |              |            |                           |        |                         | ========= |
|     | 1              | 0.920          |                |             | 64359        | 6521       |                           |        |                         |           |
|     | 2              | 1.904          |                |             | 289          | 45         |                           |        |                         |           |
|     | 3              | 2.933          |                |             | 616          | 101        |                           |        |                         |           |
|     | - <del>4</del> | 3.343          |                |             | 661          | 138        |                           |        |                         |           |
|     | 5              | 3.491          |                |             | 2047<br>1376 | 618<br>357 |                           |        |                         |           |
|     | 6<br>7         | 3.830<br>4.050 |                |             | 17908        | 5853       |                           |        |                         |           |
|     | 8              | 4.249          |                |             | 1629         | 352        |                           |        |                         |           |
|     | 9              | 4.409          |                |             | 664          | 146        | · #                       | 220 85 |                         |           |
|     | 10             | 4.591          |                |             | 687          | 145        |                           |        |                         |           |
|     | 11             | 4.684          |                |             | 8354         | 2981       |                           |        |                         |           |
|     | 12             | 5.012          |                |             | 280          | 96         |                           |        |                         |           |
| \$  | 13             | 5.375          | 5.391          | -0.016      | 580779       | 195973     | 51.8596                   | R      | Tetrachloro-meta-xylene |           |
| ,   | 14             | 5.564          |                |             | 5113         | 1246       |                           |        |                         |           |
|     | 15             | 5.841          |                |             | 777          | 207        |                           |        |                         |           |
|     | 16             | 5.914          |                |             | 1318         | 319        |                           |        |                         |           |
|     | 17             | 6.012          |                |             | 4142         | 1234       |                           |        |                         |           |
|     | 18             | 6.240          |                |             | 4892         | 1685       |                           |        |                         |           |
|     | 19             | 6.426          |                |             | 854          | 267        |                           |        |                         |           |
|     | 20             | 6.572          | 6.592          | -0.020      | 163463       | 46064      | 52.8447                   |        | BZ#8                    |           |
|     | 21             | 7.679          | 7.698          | -0.020      | 211351       | 54485      | 54.0882                   |        | BZ#18                   |           |
|     | 22             | 8.182          |                |             | 498          | 104        |                           |        |                         |           |
|     | 23             | 8.550          |                |             | 1338         | 407        |                           |        |                         |           |
|     | 24             | 9.115          | 9.137          | -0.022      | 318505       | 84183      | 49.6846                   |        | BZ#28                   |           |
|     | 25             | 9.527          |                |             | 8810         | 1374       | _                         |        |                         |           |
|     | 26             | 10.319         | 10.341         | -0.022      | 278685       | 66612      | 53.7404                   |        | BZ#52                   |           |
|     | 27             | 10.458         | 10.480         | -0.022      | 335799       | 75507      | 53.4056                   |        | BZ#49                   |           |
|     | 28             | 11.289         | 11.312         | -0.022      | 362664       | 82200      | 52.3383                   |        | BZ#44                   |           |
|     | 29             | 11.531         |                |             | 6998         | 1136       |                           |        |                         |           |
|     | 30             | 12.577         |                |             | 506          | 130        |                           |        |                         |           |
|     | 31             | 13.034         | 13.056         | -0.022      | 381371       | 78050      | 48.9100                   |        | BZ#66                   |           |
|     | 32             | 13.890         | 13.914         | -0.024      | 396670       | 79287      | 52.9876                   |        | BZ#101                  |           |
|     | 33             | 14.867         |                |             | 1148         | 231        |                           |        |                         |           |
|     | 34             | 15.397         | 15.421         | -0.024      | 834343       | 130361     | 101.406                   |        | BZ#81                   |           |
|     | 34             | 15.397         | 15.421         | -0.024      | 834343       | 130361     | 101.406                   | M      | BZ#87                   |           |
|     | 35             | 16.058         | 16.080         | -0.022      | 288688       | 44203      | 48.9910                   |        | BZ#77                   |           |
|     | 36             | 16.647         |                |             | 5140         | 674        |                           |        |                         |           |
|     | 37             | 16.924         | 16.946         | -0.022      | 416166       | 86893      | 50.9447                   |        | BZ#123                  |           |
|     | 38             | 17.053         | 17.075         | -0.022      | 465745       | 84432      | 51.2194                   |        | BZ#118                  |           |
|     | 39             | 17.629         | 17.656         | -0.027      | 512280       | 109715     | 48.3117                   |        | BZ#114                  |           |
|     | 40             | 17.775         | 17.802         | -0.027      | 518395       | 99002      | 53.4093                   |        | BZ#184                  |           |
|     | 41             | 17.971         | 17.995         | -0.024      | 482486       | 89611      | 53.3426                   |        | BZ#153                  |           |
|     | 42             | 18.695         | 18.720         | -0.024      | 486514       | 96099      | 48.4177                   |        | BZ#105                  |           |
|     | 43             | 19.172         |                |             | 34195        | 4641       |                           |        |                         |           |
|     | 44             | 19.686         | 19.713         | -0.027      | 545941       | 105307     | 52.4313                   |        | BZ#138                  | ¥.        |
| 1   | 45             | 19.979         |                |             | 4660         | 843        |                           |        |                         |           |
|     | 46             | 20.196         | 20.225         | -0.029      | 832899       | 99727      | 105.788                   |        | BZ#126                  |           |
|     | 46             | 20.196         | 20.225         | -0.029      | 832899       | 99727      | 105.788                   | М      | BZ#187                  |           |
|     | 47             | 20.460         | 20.489         | -0.029      | 594436       | 107521     | 52.7437                   |        | BZ#183                  |           |
|     | 48             | 21.030         | 21.061         | -0.031      | 513453       | 93206      | 52.8446                   |        | BZ#167                  |           |
|     | 49             | 21.433         | 21.462         | -0.029      | 598010       | 115900     | 51.9014                   |        | BZ#128                  |           |
|     | 50             | 21.874         |                |             | 2198         | 339        |                           |        |                         |           |
|     | 51             | 22.433         | 22.464         | -0.031      | 558175       | 104289     | 48.5970                   |        | BZ#156                  |           |
|     | 52             | 22.852         | 22.885         | -0.033      | 557772       | 105512     | 49.8614                   |        | BZ#157                  |           |
|     | 53             | 23.082         |                |             | 631171       | -115517    | 024924                    |        | BZ#180                  |           |
|     |                |                |                |             |              |            | ロノムター                     |        |                         |           |

|    |      |        |          |        |         |         | Extract  |       |                     |
|----|------|--------|----------|--------|---------|---------|----------|-------|---------------------|
|    | eak  | Peak   | Expected | Delta  |         |         | Conc.    |       |                     |
|    | No.  | RT     | RT       | RT     | Area    | Height  | (ppb)    | Flags | Peak Identification |
| =  | ==== |        |          |        | ======= | ======= | ======== | ===== |                     |
|    | 54   | 24.428 | 24.461   | -0.033 | 464111  | 77999   | 51.6920  |       | BZ#169              |
| \$ | 55   | 24.643 | 24.678   | -0.035 | 691884  | 126334  | 53.0940  | R     | BZ#198              |
|    | 56   | 24.969 | 25.004   | -0.035 | 643048  | 119627  | 51.3944  |       | BZ#170              |
|    | 57   | 25.195 |          |        | 11331   | 1552    |          |       |                     |
|    | 58   | 26.378 | 26.412   | -0.033 | 647561  | 116626  | 51.2564  |       | BZ#189              |
|    | 59   | 27.165 | 27.203   | -0.038 | 713968  | 128568  | 52.4934  |       | BZ#195              |
|    | 60   | 27.985 |          |        | 4200    | 312     |          |       |                     |
|    | 61   | 28.276 |          |        | 7940    | 1367    |          |       |                     |
|    | 62   | 28.843 |          |        | 536     | 53      |          |       |                     |
|    | 63   | 29.776 | 29.805   | -0.029 | 723757  | 156717  | 54.8370  | M     | BZ#206              |
|    | 64   | 30.727 | 30.754   | -0.027 | 674576  | 151895  | 55.9972  | M     | BZ#209              |
|    | 65   | 32.168 |          |        | 3050    | 68      |          |       |                     |
|    | 66   | 32.576 |          |        | 571     | 31      |          |       |                     |
|    | 67   | 32.873 |          |        | 2618    | 553     |          |       |                     |
|    | 68   | 33.075 |          |        | 2046    | 251     |          |       |                     |
|    | 69   | 33.316 |          |        | 3249    | 529     |          |       |                     |
|    | 70   | 33.427 |          |        | 3284    | 583     |          |       |                     |
|    | 71   | 33.735 |          |        | 2416    | 421     |          |       |                     |
|    | 72   | 33.806 |          |        | 3482    | 505     |          |       |                     |
|    | 73   | 34.088 |          |        | 3643    | 449     |          |       |                     |
|    | 74   | 34.604 |          |        | 16497   | 1851    |          |       |                     |
|    | 75   | 35.323 |          |        | 4095    | 396     |          |       |                     |
|    | 76   | 35.518 |          |        | 5492    | 874     |          |       |                     |
|    | 77   | 36.387 |          |        | 2545    | 379     |          |       |                     |
|    | 78   | 37.850 |          |        | 1246    | 183     |          | 20 00 |                     |
|    |      |        |          |        |         |         |          |       |                     |

Flags: A - Peak quantitates above calibration range

- a Peak quantitates below reporting limit
- H User selected alternate compound hit
- M Peak manually integrated or manually identified
- R Peak fails recovery
- U User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

| Target | Compounds |
|--------|-----------|
| Taruel | Compounds |

| Peak    | Expected   |                         |
|---------|------------|-------------------------|
| RT      | RT         | Target Compound         |
| ======= | ======     |                         |
| 5.375   | 5.391      | Tetrachloro-meta-xylene |
| 6.572   | 6.592      | BZ#8                    |
| 7.679   | 7.698      | BZ#18                   |
| 9.115   | 9.137      | BZ#28                   |
| 10.319  | 10.341     | BZ#52                   |
| 10.458  | 10.480     | BZ#49                   |
| 11.289  | 11.312     | BZ#44                   |
| 13.034  | 13.056     | BZ#66                   |
| 13.890  | 13.914     | BZ#101                  |
| 15.397  | 15.421     | BZ#87                   |
| 15.397  | 15.421     | BZ#81                   |
| 16.058  | 16.080     | BZ#77                   |
| 16.924  | 16.946     | BZ#123                  |
| 17.053  | 17.075     | BZ#118                  |
| 17.629  | 17.656     | BZ#114                  |
| 17.775  | 17.802     | BZ#184                  |
| 17.971  | 17.995     | BZ#153                  |
| 18.695  | 18.720     | BZ#105                  |
| 19.686  | 19.713     | BZ#138                  |
| 20.196  | 20.225     | BZ#126                  |
| 20.196  | 20.225     | BZ#187                  |
| 20.460  | 20.489     | BZ#183                  |
| 21.030  | 21.061     | BZ#167                  |
| 21.433  | 21 4 4 6 2 | BZ#128                  |
| 22.433  | 22.464     | BZ#156                  |
| 22.852  | 22.885     | BZ#157                  |
| 23.082  | 23.115     | BZ#180                  |
| 24.428  | 24.461     | BZ#169                  |
| 24.643  | 24.678     | BZ#198                  |
| 24.969  | 25.004     | BZ#170()25()            |

# STL Burlington - Target GC Injection Report

| Peak    | Expected |                 |
|---------|----------|-----------------|
| RT      | RT       | Target Compound |
| ======= | =======  |                 |
| 26.378  | 26.412   | BZ#189          |
| 27.165  | 27.203   | BZ#195          |
| 29.776  | 29.805   | BZ#206          |
| 30.727  | 30.754   | BZ#209          |

Client Sample

ID:

32CONG-L3

Reported Method

: 03oct021608-r261.d

1.00

CCALIB\_3 04-OCT-2002 18:41

Column Integrator.

Instrument Analyst Matrix

3327\_2.i RTX-CLPII

Sample Type :
Injection Date :
Dilution Factor :
Data File :

Lab Sample ID: 32CONG-L3

WATER

| (0.920)                                                                                                  |                |                                        |                          |                                      |
|----------------------------------------------------------------------------------------------------------|----------------|----------------------------------------|--------------------------|--------------------------------------|
| -                                                                                                        |                |                                        |                          |                                      |
| 2.939)                                                                                                   |                |                                        |                          |                                      |
| 3-3523                                                                                                   |                |                                        |                          |                                      |
| 3.033)<br>4.254/52><br>4.254/52>                                                                         |                |                                        |                          |                                      |
| -<br>-<br>-                                                                                              |                |                                        |                          | loro-nete wylene (i                  |
| 6 (42)<br>6 (42)<br>6 (428)                                                                              |                |                                        |                          | To the Agreement                     |
| 6.428)                                                                                                   | BZ#8 (6.575)   |                                        |                          |                                      |
|                                                                                                          | BZ@18 (7,6     | 81)                                    |                          |                                      |
| (8,550)<br>8,789)                                                                                        |                |                                        |                          |                                      |
| (9,527)                                                                                                  |                | BZ#28 (9                               | .115)                    |                                      |
|                                                                                                          |                | BZ#52 (10.319)<br>BZ#52 (10.458)       |                          |                                      |
|                                                                                                          |                |                                        | 207)                     |                                      |
| <del>(</del> 11,531)                                                                                     |                | BZ#44 (11.                             | 287)                     |                                      |
| 12.580)                                                                                                  |                |                                        |                          |                                      |
|                                                                                                          |                | BZ#66 (13.032)                         |                          |                                      |
|                                                                                                          |                | BZ#101 (13.89                          | 96)                      |                                      |
| (3.4.867)                                                                                                |                |                                        | х х                      |                                      |
|                                                                                                          | BZ#77 (16.053) |                                        |                          | <del> 820</del> 81 (18               |
| (16.645)                                                                                                 |                | BZ B7.63 2                             | 3.(16820)                |                                      |
|                                                                                                          |                |                                        | #153 (17.964) (17.97)    | 4 (17,625)                           |
| f                                                                                                        |                | —————————————————————————————————————— |                          | •                                    |
| (19.172)                                                                                                 |                |                                        | —BZ#105 (18,691)         |                                      |
| 2(19,977)                                                                                                |                |                                        | BZ#138 (1                |                                      |
|                                                                                                          |                |                                        | BZ#126 (20,192<br>BZ#183 | (20,455)                             |
|                                                                                                          |                |                                        | -BZ#167 (21.027)         | BZ#128 (21,431)                      |
| F21 945)                                                                                                 |                | 3541                                   |                          |                                      |
| (21,865)                                                                                                 |                |                                        | BZ#156 (2:               |                                      |
| 121,865)                                                                                                 |                |                                        |                          | 2,430)<br>2,852)<br>-BZ#180 (23,080) |
| 521,865)                                                                                                 |                |                                        | BZ#157 (2                |                                      |
|                                                                                                          |                | BZ8169 (24,42                          | BZ#157 (2                | 2,852)<br>-BZ#180 (23,080)           |
| (21,865)<br>                                                                                             |                | BZ#169 (24,42                          | BZ#157 (2                | 2,852)<br>-BZ#180 (23,080)           |
|                                                                                                          |                | BZ8169 (24,42                          | BZ#157 (2                | 2,852)<br>-BZ#180 (23,080)           |
|                                                                                                          |                | BZ8169 (24,42                          | BZ#157 (2                | 2,852)<br>-828180 (23,080)<br>       |
|                                                                                                          |                | BZ8169 (24,42                          | BZ#157 (2                | 2,852) -\$28180 (23,080)             |
| (25,195)                                                                                                 |                | BZ#169 (24,42                          | BZ#157 (2                | 2,852) -\$28180 (23,080)             |
| (25,195)<br>(228,276)                                                                                    |                | BZ#169 (24,42                          | BZ#157 (2                | 2,852) -\$28180 (23,080)             |
| (25,195)<br>(228,276)                                                                                    |                | BZ8169 (24,42                          | BZ#157 (2                | 2.982)                               |
| (25,195)<br>(228,276)                                                                                    |                | BZ#169 (24,42                          | BZ#157 (2                | 2.982)                               |
| (25,195)<br>(228,276)                                                                                    |                | BZ#169 (24,42                          | BZ#157 (2                | 2.982)                               |
| (32,159)<br>(32,876)                                                                                     |                | BZ8169 (24,42                          | BZ#157 (2                | 2.982)                               |
| (32,159)                                                                                                 |                | BZ#169 (24,42                          | BZ#157 (2                | 2.982)                               |
| (32,159)<br>(32,876)<br>(32,159)<br>(32,676)<br>(33,876)                                                 |                | BZ#169 (24,42                          | BZ#157 (2                | 2.982)                               |
| (32,159)<br>(32,159)<br>(32,876)<br>(32,876)<br>(33,133)<br>(43,134)                                     |                | BZ#169 (24,42                          | BZ#157 (2                | 2.982)                               |
| (32,159)<br>(32,876)<br>(32,878)<br>(33,878)<br>(33,844)<br>(34,600)                                     |                | BZ#169 (24,42                          | BZ#157 (2                | 2.982)                               |
| (32,159)<br>(32,159)<br>(32,678)<br>(33,864)<br>(34,600)<br>(38;833)                                     |                |                                        | BZ#157 (2                | 2.982)                               |
| (32,159)<br>(32,159)<br>(32,678)<br>(33,864)<br>(34,600)<br>(38;833)                                     |                |                                        | BZ#157 (2                | 2,852 <br>                           |
| (32,159)<br>(32,159)<br>(32,876)<br>(32,876)<br>(33,123)<br>(33,123)<br>(34,600)<br>(38,818)<br>(36,387) |                |                                        | BZ#157 (2                | 2,852 <br>                           |
| (32,159)<br>(32,159)<br>(32,876)<br>(32,876)<br>(33,123)<br>(33,123)<br>(34,600)<br>(38,818)<br>(36,387) |                |                                        | BZ#157 (2                | 2,852 <br>                           |

Lab Sample ID: 32CONG-L3 Client Sample ID: 32CONG-L3

: WATER Matrix

Sample Type : CCALIB\_3
Injection Date : 04-OCT-2002 18:41
Dilution Factor : 1.00 Analyst : V
Instrument : 3327\_2.i

Column : RTX-CLPII Data File : 03oct021608-r261.d

Integrator : Falcon Compound Sublist: all

Method : /var/chem/3327\_2.i/100302\_1/03OCT021608.b/32CONG\_3327RTXCLPII\_RAW.m Reported : 17-Oct-2002 09:58 rrm

Peaks

|          |                |                  |                  | •                |                 | Extract  |       |                         |
|----------|----------------|------------------|------------------|------------------|-----------------|----------|-------|-------------------------|
| Peak     | Peak           | Expected         | Delta            |                  |                 | Conc.    |       |                         |
| No.      | RT             | RT               | RT               | Area             | Height          | (ppb)    | Flags | Peak Identification     |
|          |                |                  |                  |                  |                 |          | ====  |                         |
| 1<br>2   | 0.920<br>2.939 |                  |                  | 64738<br>243     | 6498<br>48      |          |       |                         |
| 3        | 3.352          |                  |                  | 458              | 95              |          |       |                         |
| 4        | 3.491          |                  |                  | 2013             | 609             |          |       |                         |
| 5        | 3.833          |                  |                  | 1692             | 379             |          |       |                         |
| 6        | 4.052          |                  |                  | 10970            | 3324            |          |       |                         |
| 7        | 4.254          |                  |                  | 1731             | 301             |          |       |                         |
| 8        | 4.593          |                  |                  | 820              | 149             |          |       |                         |
| 9        | 4.686          |                  |                  | 3895             | 1254            |          |       |                         |
| 10       | 5.375          | 5.391            | -0.016           | 567376           | 190613          | 50.4586  | R     | Tetrachloro-meta-xylene |
| 11       | 5.566          |                  |                  | 5569             | 1041            |          |       |                         |
| 12       | 5.845          |                  |                  | 866              | 210             |          |       |                         |
| 13       | 5.916          |                  |                  | 1479             | 340             |          |       |                         |
| 14       | 6.014          |                  |                  | 3408             | 939             |          |       |                         |
| 15       | 6.242          |                  |                  | 4764             | 1642            |          |       |                         |
| 16       |                |                  |                  | 864              | 265             |          |       |                         |
| 17       | 6.575          | 6.592            | -0.018           | 160264           | 45095           | 51.7032  |       | BZ#8                    |
| 18       | 7.681          | 7.698            | -0.018           | 207035           | 53375           | 52.9316  |       | BZ#18                   |
| 19       | 8.550          |                  |                  | 1337             | 409             |          |       |                         |
| 20       | 8.789          | 0 133            | 0 000            | 389              | 75              | 40 2016  |       | D7#20                   |
| 21<br>22 |                | 9.137            | -0.022           | 310526<br>7284   | 81944           | 48.3916  |       | BZ#28                   |
| 23       | 10.319         | 10.341           | -0.022           | 276578           | 1148<br>64956   | 52.3491  |       | BZ#52                   |
| 24       |                | 10.341           | -0.022           | 328493           | 73491           | 51.9347  |       | BZ#49                   |
| 25       |                | 11.312           | -0.024           | 352765           | 80127           | 50.9959. |       | BZ#44                   |
| 26       |                | 11.512           | 0.021            | 6423             | 1065            | 30.3333. |       | D D Π 1.1               |
| 27       |                |                  |                  | 491              | 124             |          |       |                         |
| 28       |                | 13.056           | -0.024           | 371825           | 75749           | 47.5176  |       | BZ#66                   |
| 29       |                | 13.914           | -0.024           | 388283           | 77257           | 51.5988  |       | BZ#101                  |
| 30       | 14.867         |                  |                  | 986              | 211             |          |       |                         |
| 31       | 15.395         | 15.421           | -0.027           | 809681           | 124577          | 97.0218  |       | BZ#81                   |
| 31       | 15.395         | 15.421           | -0.027           | 809681           | 124577          | 97.0218  | M     | BZ#87                   |
| 32       | 16.053         | 16.080           | -0.027           | 277981           | 42477           | 47.1760  |       | BZ#77                   |
| 33       | 16.645         |                  |                  | 4795             | 638             |          |       |                         |
| 34       |                | 16.946           | -0.027           | 405350           | 84394           | 49.5150  |       | BZ#123                  |
| 35       |                | 17.075           | -0.027           | 457104           | 81858           | 49.6885  |       | BZ#118                  |
| 36       |                | 17.656           | -0.031           | 496145           | 105804          | 46.6810  |       | BZ#114                  |
| 37       |                | 17.802           | -0.031           | 511893           | 96980           | 52.2909  |       | BZ#184                  |
| 38       |                | 17.995           | -0.031           | 472709           | 87857           | 52.2799  |       | BZ#153                  |
| 39       |                | 18.720           | -0.029           | 473413           | 91495           | 46.2311  |       | BZ#105                  |
| 40       |                | 10 712           |                  | 7380             | 853             | E0 0355  |       | DG#130                  |
| 41       |                | 19.713           | -0.031           | 531840           | 102094          | 50.8389  |       | BZ#138                  |
| 42       |                | 20 225           | 0 022            | 4782             | 845             | 100 (00  | E4 •  | P7#126                  |
| 43       |                | 20.225           | -0.033           | 809994           | 96781           |          | м     | BZ#126                  |
| 43<br>44 |                | 20.225<br>20.489 | -0.033<br>-0.033 | 809994<br>583276 | 96781<br>104819 |          | 147   | BZ#187<br>BZ#183        |
| 45       |                | 21.061           | -0.033           | 500783           | 89813           |          |       | BZ#163<br>BZ#167        |
| 46       |                | 21.462           | -0.033           | 584429           | 113182          |          |       | BZ#137                  |
| 47       |                | 21.402           | 5.051            | 2665             | 367             |          |       | 2211 2 2 0              |
| 48       |                | 22.464           | -0.033           | 543456           | 101226          |          |       | BZ#156                  |
| 49       |                | 22.885           | -0.033           | 1542760          | 101734          |          |       | BZ#157                  |
| 50       |                | 23.115           | -0.035           | 617879           | 112310          |          |       | BZ#180                  |
| 51       |                | 24.461           |                  | 449669           | 75608           |          |       | BZ#169                  |
| 52       |                | 24.678           | -0.035           | 676653           | 122549          |          | R     | BZ#198                  |
| 53       |                |                  | -0.035           | 627201           | 118748          |          |       | BZ#170                  |
|          |                |                  |                  |                  |                 | 0253     |       |                         |

|       |         |          |        |         |         | Extract  |       |                          |
|-------|---------|----------|--------|---------|---------|----------|-------|--------------------------|
| Peak  | Peak    | Expected | Delta  |         |         | Conc.    |       |                          |
| No.   | RT      | RT       | RT     | Area    | Height  | (ppb)    | Flags | Peak Identification      |
| ===== | ======= |          |        | ======= | ======= | ======== | ===== | ************************ |
| 54    | 25.195  |          |        | 11887   | 1551    |          |       |                          |
| 55    | 26.376  | 26.412   | -0.035 | 629862  | 112660  | 49.5577  |       | BZ#189                   |
| 56    | 27.167  | 27.203   | -0.035 | 695396  | 125244  | 51.1466  |       | BZ#195                   |
| 57    | 28.276  |          |        | 5561    | 1075    |          |       | 5                        |
| 58    | 28.817  |          |        | 347     | 51      |          |       |                          |
| 59    | 29.776  | 29.805   | -0.029 | 707878  | 152759  | 53.4305  | M     | BZ#206                   |
| 60    | 30.725  | 30.754   | -0.029 | 658513  | 147878  | 54.4575  | M     | BZ#209                   |
| 61    | 32.159  |          |        | 3032    | 101     |          |       |                          |
| 62    | 32.878  |          |        | 3610    | 266     |          |       |                          |
| 63    | 33.312  |          |        | 2560    | 505     |          |       |                          |
| 64    | 33.425  |          |        | 3074    | 556     |          |       |                          |
| 65    | 33.740  |          |        | 2236    | 376     |          |       |                          |
| 66    | 33.804  |          |        | 3324    | 461     |          |       |                          |
| 67    | 34.600  |          |        | 10180   | 1045    |          |       |                          |
| 68    | 35.323  |          |        | 2879    | 293     |          |       |                          |
| 69    | 35.515  |          |        | 2563    | 404     |          |       |                          |
| 70    | 36.387  |          |        | 1955    | 326     |          |       |                          |
| 71    | 37.845  |          |        | 862     | 139     |          |       |                          |
| 72    | 39.397  |          |        | 3062    | 251     |          |       |                          |
|       |         |          |        |         |         |          |       |                          |

Flags: A - Peak quantitates above calibration range a - Peak quantitates below reporting limit

- H User selected alternate compound hit
- M Peak manually integrated or manually identified
- R Peak fails recovery
- U User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

#### Target Compounds

| Peak   | Expected |                                         |
|--------|----------|-----------------------------------------|
| RT     | RT       | Target Compound                         |
|        | =======  | ======================================= |
| 5.375  | 5.391    | Tetrachloro-meta-xylene                 |
| 6.575  | 6.592    | BZ#8                                    |
| 7.681  | 7.698    | BZ#18                                   |
| 9.115  | 9.137    | BZ#28                                   |
| 10.319 | 10.341   | BZ#52                                   |
| 10.458 | 10.480   | BZ#49                                   |
| 11.287 | 11.312   | BZ#44                                   |
| 13.032 | 13.056   | BZ#66                                   |
| 13.890 | 13.914   | BZ#101                                  |
| 15.395 | 15.421   | BZ#87                                   |
| 15.395 | 15.421   | BZ#81                                   |
| 16.053 | 16.080   | BZ#77                                   |
| 16.920 | 16.946   | BZ#123                                  |
| 17.048 | 17.075   | BZ#118                                  |
| 17.625 | 17.656   | BZ#114                                  |
| 17.771 | 17.802   | BZ#184                                  |
| 17.964 | 17.995   | BZ#153                                  |
| 18.691 | 18.720   | B2#105                                  |
| 19.682 | 19.713   | BZ#138                                  |
| 20.192 | 20.225   | BZ#126                                  |
| 20.192 | 20.225   | BZ#187                                  |
| 20.455 | 20.489   | BZ#183                                  |
| 21.027 | 21.061   | BZ#167                                  |
| 21.431 | 21.462   | BZ#128                                  |
| 22.430 | 22.464   | BZ#156                                  |
| 22.852 | 22.885   | BZ#157                                  |
| 23.080 | 23.115   | BZ#180                                  |
| 24.428 | 24.461   | B2#169                                  |
| 24.643 | 24.678   | BZ#198                                  |
| 24.969 | 25.004   | BZ#170                                  |
| 26.376 | 26.412   | BZ#189                                  |
| 27.167 | 27.203   | BZ#195                                  |
| 29.776 | 29.805   | BZ#206                                  |
| 30.725 | 30.754   | BZ#209                                  |
|        |          |                                         |



**Severn Trent Laboratories, Inc.** 

# PCB CONGENERS RAW QC DATA

## FORM 1 OTHER ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

PBLKO8

Lab Name: STL BURLINGTON Contract: 22000

Sample wt/vol: 30.0 (g/mL) G

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

Matrix: (soil/water) SOIL Lab Sample ID: PBLKO8

Lab File ID: 030CT021608-R011

% Moisture: 0 decanted: (Y/N) N Date Received:

Extraction: (SepF/Cont/Sonc) SOXH Date Extracted: 09/26/02

Concentrated Extract Volume: 10(mL) Date Analyzed: 10/03/02

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: \_\_\_\_ Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG 34883-43-7----BZ#8 1.7 U 37680-65-2----BZ#18 1.7 U 7012-37-5----BZ#28 1.7 U 41464-39-5----BZ#44 1.7 U 35693-99-3----BZ#52 1.7 U 32598-10-0----BZ#66 1.7 0 1.7 U 32598-13-3----BZ#77 1.7 U 37680-73-2----BZ#101 32598-14-4----BZ#105 1.7 0 31508-00-6----BZ#118 1.7 U 57465-28-8----BZ#126 1.7 U 38380-07-3----BZ#128 1.7 U 35065-28-2----BZ#138 1.7 U 35065-27-1----BZ#153 1.7 0 35065-30-6----BZ#170 1.7 U 35065-29-3----BZ#180 1.7 0 1.7 U 52663-68-0----BZ#187 52663-78-2----BZ#195 1.7 U 40186-72-9----BZ#206 1.7 0 2051-24-3----BZ#209 1.7 U

FORM I OTHER

Integrator Method

Column Instrument Analyst Matrix

: 3327 1.i : RTX-5 : Falcon

Sample Type : Injection Date : Dilution Factor :

1.00

03-OCT-2002 23:55

BLANK

Lab Sample

ID:

PBLK08

Client Sample

Ħ.

PBLK08

SOIL

| (0,862)<br>(0,898)<br>(1,164)           |   |                  |                      |                                |
|-----------------------------------------|---|------------------|----------------------|--------------------------------|
| <del>(1988)</del>                       |   |                  |                      | (9)                            |
| 7,325)<br>=(2,5%)682)<br>(3,0993,245)   |   |                  |                      |                                |
| 3.558)<br>3.941 <sup>775)</sup>         |   |                  |                      |                                |
| 3.58)<br>3.541/75)<br>3.541/75)         |   |                  |                      | - 45 AAT)                      |
| 5,805)<br>(5,289)<br>(5,584)<br>(6,043) |   |                  | Tetrachioro-neta xyi | ine (01000)                    |
| £;8435                                  |   |                  |                      | İ                              |
| £7.401)                                 |   |                  |                      |                                |
| <b>日:323</b> }<br>(18.319)<br>(18.572)  |   |                  |                      |                                |
| 68,572)<br>08,989)<br>09,257)           |   |                  |                      | :                              |
| £9.669>                                 |   |                  |                      |                                |
|                                         |   |                  |                      |                                |
| (11,254)                                |   |                  |                      |                                |
| C12,209>                                |   |                  |                      |                                |
|                                         |   |                  |                      |                                |
|                                         |   |                  |                      |                                |
| <u>(1</u> 4.947)                        |   |                  | ·- 20 to             |                                |
| (16:428)<br>5(16:328)                   |   |                  |                      |                                |
|                                         |   |                  |                      |                                |
| (17,332)                                |   |                  |                      | ¥E                             |
| (18:021)<br>(18:655)                    |   |                  |                      | LiChre                         |
| 719,148)                                |   |                  |                      | 8                              |
| (1.9.795)<br>(1.20.458)                 |   |                  |                      | 03oct                          |
| 7(20,790)                               |   |                  |                      | .02160                         |
| (21.961)<br>(22.282)                    |   |                  |                      | HultiChrom GC 03oct021608,i011 |
|                                         |   | -BZ#198 (22,559) |                      |                                |
|                                         |   |                  |                      |                                |
| (24,552)                                |   |                  |                      |                                |
|                                         |   |                  |                      |                                |
|                                         |   |                  |                      |                                |
| 5(27,653)                               |   |                  |                      |                                |
| 1728,353)                               |   |                  |                      |                                |
| 229.180)                                |   |                  |                      |                                |
|                                         |   |                  |                      | -                              |
| K31.146>                                |   |                  |                      |                                |
|                                         |   |                  |                      |                                |
| (32,235)<br>(132,583)<br>(132,880)      |   |                  |                      |                                |
| ≥(33,512)                               |   |                  |                      |                                |
|                                         |   |                  |                      |                                |
| }                                       |   |                  |                      |                                |
| (36.274)                                | i |                  |                      |                                |
|                                         | 1 |                  |                      |                                |
|                                         |   |                  |                      |                                |
|                                         |   |                  |                      |                                |
|                                         |   | 0                | 257                  |                                |

Y (x10^5)

Lab Sample ID: PBLKO8 Client Sample ID: PBLKO8

Sample Type : BLANK

Injection Date : 03-OCT-2002 23:55

Dilution Factor: 1.00

Column : RTX-5 Integrator : Falcon Data File : 03oct021608-r011.d

Compound Sublist: ENVNET

Method : /var/chem/3327\_1.i/100302\_1/03OCT021608.b/32CONG\_3327RTX5\_RAW.m Reported : 17-Oct-2002\_09:43\_rrm

Peaks

|          |                  | _        |       |              |                   |          |       |                         |
|----------|------------------|----------|-------|--------------|-------------------|----------|-------|-------------------------|
|          |                  |          |       |              |                   | Extract  |       |                         |
| Peak     | Peak             | Expected | Delta |              |                   | Conc.    |       |                         |
| No.      | RT               | RT       | RT    | Area         | Height            | (ppb)    | Flags | Peak Identification     |
| =====    |                  | =======  |       |              | =======           | ======== |       |                         |
| 1<br>2   | 0.862<br>0.898   |          |       | 775<br>76586 | 338<br>7903       |          |       |                         |
| 3        | 1.164            |          |       | 61824        | 9228              |          |       |                         |
| 4        | 1.403            |          |       | 17160        | 3465              |          |       |                         |
| 5        | 1.882            |          |       | 9955         | 1919              |          |       |                         |
| 6        | 1.975            |          |       | 5945         | 744               |          |       |                         |
| 7        | 2.325            |          |       | 852          | 170               |          |       |                         |
| 8        | 2.594            |          |       | 8726         | 2344              |          |       |                         |
| 9        | 2.682            |          |       | 26803        | 5901              | 8        | 35 17 |                         |
| 10       | 3.099            |          |       | 2855         | 391               |          |       |                         |
| 11<br>12 | 3.245<br>3.558   |          |       | 19183<br>650 | 5194              |          |       |                         |
| 13       | 3.775            |          |       | 9590         | 218<br>3137       |          |       |                         |
| 14       | 3.941            |          |       | 2855         | 346               |          |       |                         |
| 15       | 4.183            |          |       | 587          | 128               |          |       |                         |
| 16       | 4.311            |          |       | 906          | 255               |          |       |                         |
| 17       | 4.402            |          |       | 5502         | 1845              |          |       |                         |
| 18       | 4.602            |          |       | 574          | 195               |          |       |                         |
| 19       | 4.697            |          |       | 3247         | 653               |          |       |                         |
| \$ 20    | 5.003            | 5.001    | 0.002 | 348559       | 137649            | 43.6738  |       | Tetrachloro-meta-xylene |
| 21       | 5.289            |          |       | 2042         | 275               |          |       |                         |
| 22<br>23 | 5.584<br>5.805   |          |       | 4379         | 1420              |          |       |                         |
| 24       | 6.043            |          |       | 421<br>483   | 79<br>171         |          |       |                         |
| 25       | 7.401            |          |       | 1095         | 375               |          |       |                         |
| 26       | 7.772            |          |       | 1182         | 283               | •        |       |                         |
| 27       | 7.929            |          |       | 403          | 104               |          |       |                         |
| 28       | 8.319            |          |       | 2023         | 600               |          |       |                         |
| 29       | 8.572            |          |       | 273          | 75                |          |       |                         |
| 30       | 8.989            |          |       | 581          | 119               |          |       |                         |
| 31       | 9.257            |          |       | 1500         | 286               |          |       |                         |
| 32       | 9.669            |          |       | 656          | 133               |          |       |                         |
| 33<br>34 | 11.254<br>12.209 |          |       | 439<br>649   | 94                |          |       |                         |
| 35       | 14.947           |          |       | 672          | 135<br>125        |          |       |                         |
| 36       | 16.018           |          |       | 2247         | 316               |          |       |                         |
| 37       | 16.177           |          |       | 674          | 149               |          |       |                         |
| 38       | 16.326           |          |       | 14527        | 1134              |          |       |                         |
| 39       | 17.332           |          |       | 2853         | 383               |          |       |                         |
| 40       | 18.021           |          |       | 2243         | 460               |          |       |                         |
| 41       | 18.163           |          |       | 1140         | 238               |          |       |                         |
| 42       | 18.655           |          |       | 1669         | 290               |          |       |                         |
| 43       | 19.148           |          |       | 439          | 89                |          |       |                         |
| 44<br>45 | 19.795<br>20.458 |          |       | 1117         | 167               |          |       |                         |
| 46       | 20.436           |          |       | 871<br>3803  | 164<br>521        |          |       |                         |
| 47       | 21.961           |          |       | 1572         | 259               |          |       |                         |
| 48       | 22.282           |          |       | 2363         | 412               |          |       |                         |
| \$ 49    | 22.559           | 22.559   | 0.000 | 340615       | 64730             | 43.3796  |       | BZ#198                  |
| 50       | 24.552           |          |       | 2747         | 416               |          |       | <del>.</del> .          |
| 51       | 27.653           |          |       | 2736         | 499               |          |       |                         |
| 52       | 28.353           |          |       | 1295         | 248               |          |       |                         |
| 53       | 29.180           |          |       | 4741         | 677               |          |       |                         |
| 54       | 31.146           |          |       | 195          | 54                |          |       |                         |
| 55       | 32.235           |          |       | 10572        | - 3153 <b>(</b> ) | 258      |       |                         |
| 5.2      |                  |          |       |              | J                 | _ 00     |       |                         |

## STL Burlington - Target GC Injection Report

|       |        |          |         |       |        | Extract    |       |                     |
|-------|--------|----------|---------|-------|--------|------------|-------|---------------------|
| Peak  | Peak   | Expected | Delta   |       |        | Conc.      |       |                     |
| No.   | RT     | RT       | RT      | Area  | Height | (ppb)      | Flags | Peak Identification |
| ===== |        | =======  | ======= |       |        | . ======== | ===== |                     |
| 56    | 32.583 |          |         | 1787  | 291    |            |       |                     |
| 57    | 32.800 |          |         | 4849  | 768    |            |       |                     |
| 58    | 33.512 |          |         | 11376 | 1661   |            |       |                     |
| 59    | 36.274 |          |         | 1339  | 284    |            |       |                     |

Flags: A - Peak quantitates above calibration range

- a Peak quantitates below reporting limit
- H User selected alternate compound hit
- M Peak manually integrated or manually identified
- R Peak fails recovery
- U User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

| Ma     | a         |
|--------|-----------|
| Target | Compounds |

| Peak   | Expected |                         |
|--------|----------|-------------------------|
| RT     | RT       | Target Compound         |
|        | =======  |                         |
| 5.003  | 5.001    | Tetrachloro-meta-xylene |
|        | 5.761    | BZ#8                    |
|        | 6.701    | BZ#18                   |
|        | 7.925    | BZ#28                   |
|        | 8.984    | BZ#52                   |
|        | 9.667    | BZ#44                   |
|        | 11.243   | BZ#66                   |
|        | 12.207   | BZ#101                  |
|        | 13.752   | BZ#77                   |
|        | 14.938   | BZ#118                  |
|        | 15.993   | BZ#153                  |
|        | 16.155   | BZ#105                  |
|        | 17.328   | BZ#138                  |
|        | 17.762   | BZ#126                  |
|        | 18.647   | BZ#128                  |
|        | 20.781   | BZ#180                  |
|        | 22.271   | BZ#170                  |
| 22.559 | 22.559   | BZ#198                  |
|        | 24.552   | BZ#195                  |
|        | 27.655   | BZ#206                  |
|        | 29.180   | BZ#209                  |

| 60.856) (0.010)                                       |          |   |                    | =                              |                                                                                                                      |
|-------------------------------------------------------|----------|---|--------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------------|
| 0,856) (0,949)<br>                                    |          |   |                    | F 95 H = 5                     |                                                                                                                      |
| N-12-0477<br>12-0405)<br>                             |          |   |                    | 1,0                            |                                                                                                                      |
| W 53.0559273.230)                                     |          |   |                    |                                |                                                                                                                      |
| 53 5077 (3,230)<br>53 5077 (3,250)<br>54 5077 (3,250) |          |   |                    |                                |                                                                                                                      |
| o- 善i鏡i                                               | <u> </u> |   | - Tobacah lama nah | 14-mylene (5,306)              | 2 96 ° 6                                                                                                             |
| **5.577)<br>**                                        |          |   |                    | W Wystric 1010007              | Lab<br>Mat:<br>Ana<br>Ins<br>Col:<br>Int<br>Met]                                                                     |
| ##:\$18}<br>~-                                        |          |   |                    |                                |                                                                                                                      |
| ω-                                                    |          |   |                    | 420                            | Samploix yst rument mn gratos tod orted                                                                              |
| 178,563)<br>9-179,124)                                |          |   |                    |                                | ple<br>ent<br>tor                                                                                                    |
| p(9.541)                                              |          |   |                    |                                |                                                                                                                      |
| 6-<br>5(10,385)                                       |          |   |                    |                                |                                                                                                                      |
| #- <del>244.393</del> 0                               |          |   |                    |                                | PBLKO8 SOIL 3327 2.i RTX-CLPII Falcon /var/chen 17-Oct-20                                                            |
| ₽-                                                    |          |   |                    |                                | PBLKO8 SOIL SOIL 3327_2 RTX-CL Falcon /var/cl                                                                        |
| CL3.052)                                              |          |   |                    |                                | 2.<br>2.<br>2.<br>2.<br>2.<br>2.<br>2.<br>3.<br>3.<br>3.<br>3.<br>3.<br>3.<br>3.<br>3.<br>3.<br>3.<br>3.<br>3.<br>3. |
| F-(C13.916)                                           |          |   |                    |                                | SOIL SOIL TX-CLPII alcon var/chem/3 7-Oct-2002                                                                       |
| tà-                                                   |          |   | =<br>•= 8 €        |                                | ω                                                                                                                    |
| BZ#81 (15,444)                                        |          |   |                    |                                | 27                                                                                                                   |
| 126,465)                                              |          |   |                    |                                | :  <br>5 Ν<br>ω .                                                                                                    |
| 5- C17.082)                                           |          |   |                    | <u> </u>                       | r 1/                                                                                                                 |
| ₩- (17,988)                                           |          |   |                    | HultiChrom GC 03oct021608,1011 | Client Sample Inject Diluti Data F Compou /100302 rrm                                                                |
| (19,230)                                              |          |   |                    | brog a                         | Client Sample Inject Diluti Data F Compou .00302                                                                     |
| 5- 5(19.230)<br>5(19.706)<br>8- 1720,205)             |          |   |                    | GC 03                          | Client Sam Sample Typ Injection Dilution File Data File Compound S 100302_1/03 cm                                    |
| 2-                                                    |          |   |                    | pet02:                         | nt Samp le Type ction D tion Fale File ound Sul 2_1/0300                                                             |
| N21.460)                                              |          |   |                    | 608.1                          | Samp. Type on Da n Fac 1e ld Sul                                                                                     |
| BZ#156 (22,468)<br>(722,787)                          |          |   |                    | 011                            | ample ID: /pe : 1 Date : Factor : 2 Sublist: 030CT0216                                                               |
| ₩. <b>5</b> (23.111)                                  |          |   |                    |                                | ID ID st                                                                                                             |
| N-<br>5(24,317)                                       |          | - | BZ#198 (24,669)    |                                | 0                                                                                                                    |
| N- <del>≤€24,993</del> )                              |          |   | BZ#176 (24.067)    |                                | PBLKO BLANK 03-OC 1.00 03oct ENVNE 8.b/3                                                                             |
| N (25,837)                                            |          |   |                    |                                | PBLKO8 BLANK 03-OCT 1.00 03-OCt 03-OCt 8.b/32                                                                        |
| N- (127.192)                                          |          |   |                    |                                |                                                                                                                      |
| N= (28.014)<br>(28.320)                               |          |   |                    |                                | 2002<br>1608                                                                                                         |
| 728,320)<br>728,839)                                  |          |   |                    |                                | 3-r 2                                                                                                                |
| T                                                     | (40)     |   |                    |                                | -2002 23:55<br>21608-r011.d<br>CONG_3327RTXCLPII                                                                     |
| (70.747)                                              |          |   |                    |                                | orx.                                                                                                                 |
| (-31,505)                                             |          |   |                    |                                | CIT                                                                                                                  |
| <b>∺</b>                                              |          |   |                    |                                | H                                                                                                                    |
| 원 (중국 (중국 884)<br>및                                   |          |   |                    |                                |                                                                                                                      |
| <b>4</b> -                                            |          |   |                    |                                | RAW.m                                                                                                                |
| (34, 620)                                             |          |   |                    |                                | Ħ                                                                                                                    |
| 0 <u>5</u> 35,535)                                    |          |   |                    |                                | 2.50                                                                                                                 |
| <b>8</b> -                                            | į •      |   |                    |                                |                                                                                                                      |
| 4-                                                    |          |   |                    |                                |                                                                                                                      |

0260

0.7-

(37.870)

38 39

8

9.9

1.0-

1.1-

1.6-

Lab Sample ID: PBLKO8 Client Sample ID: PBLKO8

Matrix : SOIL

Sample Type : BLANK
Injection Date : 03-OCT-2002 23:55
Dilution Factor : 1.00 Instrument : 3327\_2.i

: RTX-CLPII : 03oct021608-r011.d Column Data File

Compound Sublist: ENVNET Integrator : Falcon

Method : /var/chem/3327\_2.i/100302\_1/030CT021608.b/32CONG\_3327RTXCLPII\_RAW.m Reported : 17-Oct-2002 09:53 rrm

Peaks

|    | eak      | Peak             | Expected | Delta   |              |                    | Extract<br>Conc. |       |                         |  |
|----|----------|------------------|----------|---------|--------------|--------------------|------------------|-------|-------------------------|--|
|    | 10.      | RT               | RT       | RT      | Area         | Height             | (ppb)            | Flags | Peak Identific          |  |
| =: | 1        | 0.856            |          | ======= | 469          | 202                | =========        | ===== |                         |  |
|    | 2        | 0.838            |          |         | 95413        | 8172               |                  |       |                         |  |
|    | 3        | 1.239            |          |         | 63917        | 8585               |                  |       |                         |  |
|    | 4        | 1.625            |          |         | 17619        | 3549               |                  |       |                         |  |
|    | 5        | 1.813            |          |         | 3540         | 1010               |                  |       |                         |  |
|    | 6        | 1.900            |          |         | 2194         | 638                |                  |       |                         |  |
|    | 7        | 2.017            |          |         | 327          | 84                 |                  |       |                         |  |
|    | 8        | 2.405            |          |         | 980          | 152                |                  | 00 (8 |                         |  |
|    | 9        | 2.793            |          |         | 9249         | 1714               | • •              | 17    |                         |  |
|    | 10       | 3.055            |          |         | 1086         | 327                |                  |       |                         |  |
|    | 11       | 3.123            |          |         | 11540        | 3214               |                  |       |                         |  |
|    | 12       | 3.230            |          |         | 35064        | 8122               |                  |       |                         |  |
|    | 13       | 3.507            |          |         | 4068         | 792                |                  |       |                         |  |
|    | 14<br>15 | 3.682<br>3.766   |          |         | 909<br>1973  | 216<br><b>4</b> 25 |                  |       |                         |  |
|    | 16       | 3.846            |          |         | 2348         | 531                |                  |       |                         |  |
|    | 17       | 3.950            |          |         | 19437        | 6885               |                  |       |                         |  |
|    | 18       | 4.061            |          |         | 15641        | 4330               |                  |       |                         |  |
|    | 19       | 4.229            |          |         | 5120         | 657                |                  |       |                         |  |
|    | 20       | 4.409            |          |         | 2496         | 340                |                  |       |                         |  |
|    | 21       | 4.582            |          |         | 1606         | 300                |                  |       |                         |  |
|    | 22       | 4.697            |          |         | 6680         | 1966               |                  |       |                         |  |
|    | 23       | 4.850            |          |         | 1758         | 316                |                  |       |                         |  |
|    | 24       | 5.023            |          |         | 308          | 113                |                  |       |                         |  |
|    | 25       | 5.107            |          |         | 757          | 216                |                  |       |                         |  |
|    | 26       | 5.196            |          |         | 223          | 64                 |                  |       |                         |  |
| \$ | 27       | 5.386            | 5.391    | -0.004  | 476174       | 163068             | 43.2586          |       | Tetrachloro-meta-xylene |  |
|    | 28       | 5.577            |          |         | 4995         | 929                |                  |       |                         |  |
|    | 29       | 6.025            |          |         | 3123         | 882                |                  |       |                         |  |
|    | 30       | 6.253            |          |         | 3964         | 1376               |                  |       |                         |  |
|    | 31       | 6.508            |          |         | 255<br>434   | 98<br>159          |                  |       |                         |  |
|    | 32<br>33 | 6.615<br>8.563   |          |         | 1290         | 362                |                  |       |                         |  |
|    | 34       | 9.124            |          |         | 989          | 185                |                  |       |                         |  |
|    | 35       | 9.541            |          |         | 3070         | 602                |                  |       |                         |  |
|    | 36       | 10.385           |          |         | 5442         | 1057               |                  |       |                         |  |
|    | 37       | 11.307           |          |         | 709          | 146                |                  |       |                         |  |
|    | 38       | 11.391           |          |         | 4319         | 724                |                  |       |                         |  |
|    | 39       | 13.052           |          |         | 550          | 108                |                  |       |                         |  |
|    | 40       | 13.916           |          |         | 1118         | 211                |                  |       |                         |  |
|    | 41       | 15.444           |          |         | 1284         | 141                |                  |       |                         |  |
|    | 42       | 16.465           |          |         | 444          | 89                 |                  |       |                         |  |
|    | 43       | 17.082           |          |         | 1542         | 210                |                  |       |                         |  |
|    | 44       | 17.988           |          |         | 2696         | 414                |                  | 1.038 |                         |  |
|    | 45       | 18.735           |          |         | 1654         | 246                |                  |       |                         |  |
|    | 46       | 19.230           |          |         | 16678        | 1726               |                  |       |                         |  |
|    | 47       | 19.706           |          |         | 5237         | 583                |                  |       |                         |  |
|    | 48       | 20.005           |          |         | 2850         | 553                |                  |       |                         |  |
|    | 49       | 20.216           |          |         | 2655<br>2172 | 423                |                  |       |                         |  |
|    | 50<br>51 | 21.460<br>21.910 |          |         | 1 2172       | 372<br>168         |                  |       |                         |  |
|    | 51<br>52 | 22.468           |          |         | 1417         | 241                |                  |       |                         |  |
|    | 52       | 22.468           |          |         | 1234         | 129                |                  |       |                         |  |
|    | 54       | 23.111           |          |         | 4004         | 639                |                  |       |                         |  |
|    | 24       |                  |          |         | 7007         | 719                |                  |       |                         |  |

## STL Burlington - Target GC Injection Report

|    |      |        |          |        |         |         | Extract |       |        |         |                                         |
|----|------|--------|----------|--------|---------|---------|---------|-------|--------|---------|-----------------------------------------|
| P  | eak  | Peak   | Expected | Delta  |         |         | Conc.   |       |        |         |                                         |
| 1  | No.  | RT     | RT       | RT     | Area    | Height  | (ppb)   | Flags |        | Peak I  | dentification                           |
| =  | ==== |        | =======  |        | ======= | ======= |         | ===== |        | ======= | ======================================= |
| \$ | 56   | 24.669 | 24.678   | -0.009 | 549928  | 101003  | 42.4161 |       | BZ#198 |         |                                         |
|    | 57   | 24.993 |          |        | 6445    | 828     |         |       |        |         |                                         |
|    | 58   | 25.837 |          |        | 1073    | 136     |         |       |        |         |                                         |
|    | 59   | 27.192 |          |        | 2516    | 470     |         |       |        | •       |                                         |
|    | 60   | 28.014 |          |        | 906     | 115     |         |       |        |         |                                         |
|    | 61   | 28.320 |          |        | 275     | 41      |         |       |        |         |                                         |
|    | 62   | 28.839 |          |        | 590     | 52      |         |       |        |         |                                         |
|    | 63   | 29.799 |          |        | 7306    | 929     |         |       |        |         |                                         |
|    | 64   | 30.085 |          |        | 2876    | 369     |         |       |        |         |                                         |
|    | 65   | 30.747 |          |        | 10099   | 1150    |         |       |        |         |                                         |
|    | 66   | 31.505 |          |        | 3669    | 387     |         |       |        |         |                                         |
|    | 67   | 32.884 |          |        | 57309   | 5226    |         |       |        |         |                                         |
|    | 68   | 33.088 |          |        | 3643    | 704     |         |       |        |         |                                         |
|    | 69   | 33.308 |          |        | 7502    | 818     |         |       |        |         |                                         |
|    | 70   | 34.620 |          |        | 17728   | 2059    |         |       |        |         |                                         |
|    | 71   | 35.535 |          |        | 3884    | 596     |         |       |        |         |                                         |
|    | 72   | 37.870 |          |        | 2739    | 447     |         |       |        |         |                                         |
|    | 73   | 39.441 |          |        | 641     | 95      |         |       |        |         |                                         |

Flags: A - Peak quantitates above calibration range a - Peak quantitates below reporting limit

H - User selected alternate compound hit

M - Peak manually integrated or manually identified

R - Peak fails recovery

U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

Target Compounds

| Peak    | Expected |                         |
|---------|----------|-------------------------|
| RT      | RT       | Target Compound         |
| ======= | *======  |                         |
| 5.386   | 5.391    | Tetrachloro-meta-xylene |
|         | 6.592    | BZ#8                    |
|         | 7.698    | BZ#18                   |
|         | 9.137    | BZ#28                   |
|         | 10.341   | BZ#52                   |
|         | 11.312   | BZ#44                   |
|         | 13.056   | BZ#66                   |
|         | 13.914   | BZ#101                  |
|         | 16.080   | BZ#77                   |
|         | 17.075   | BZ#118                  |
|         | 17.995   | BZ#153                  |
|         | 18.720   | BZ#105                  |
|         | 19.713   | BZ#138                  |
|         | 20.225   | BZ#126                  |
|         | 21.462   | BZ#128                  |
|         | 23.115   | BZ#180                  |
| 24.669  | 24.678   | BZ#198                  |
|         | 25.004   | BZ#170                  |
|         | 27.203   | BZ#195                  |
|         | 29.805   | BZ#206                  |
|         | 30.754   | BZ#209                  |
|         |          |                         |

## FORM 1 OTHER ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

PIBLK SCU

Lab Name: STL BURLINGTON

Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.:

SDG No.: 89891

Matrix: (soil/water) SOIL

Lab Sample ID: PIBLK SCU

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: 030CT021608-R141

% Moisture: 0 decanted: (Y/N) N

Date Received: \_\_\_\_

Extraction: (SepF/Cont/Sonc) OTHER

Date Extracted:

Concentrated Extract Volume: 10(mL) Date Analyzed: 10/04/02

Injection Volume: 1.0(uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: \_\_\_ Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS:

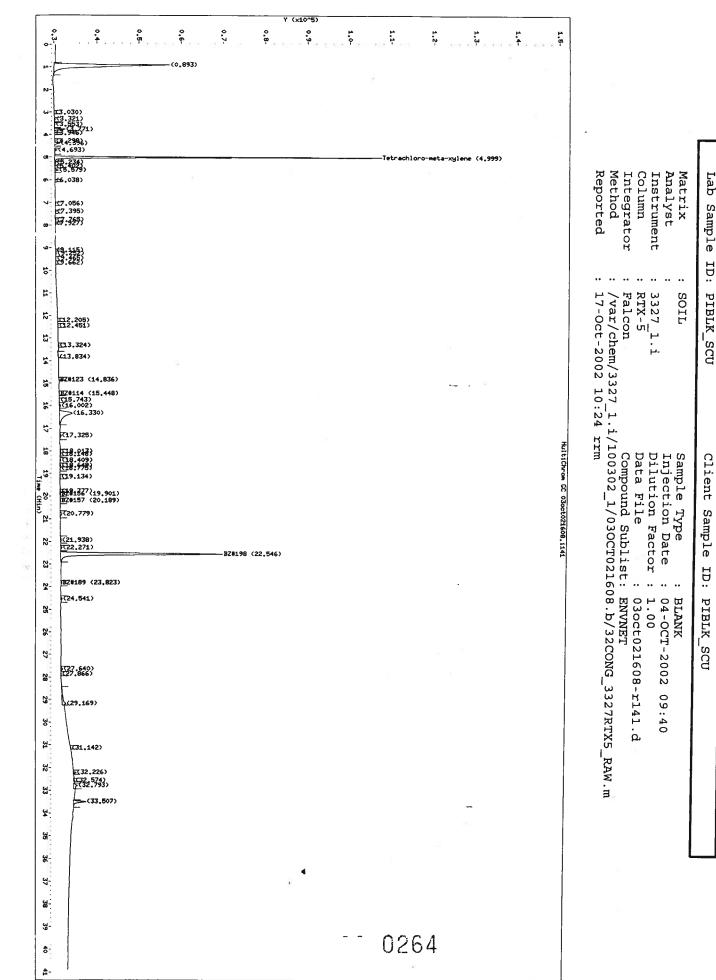
CAS NO. COMPOUND

(ug/L or ug/Kg) UG/KG

Q

|                                                                                                                                                                             | 1. 127 |                                                             |                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------------------------------------------------|----------------------------|
| 34883-43-7BZ#8 37680-65-2BZ#18 7012-37-5BZ#28 41464-39-5BZ#44 35693-99-3BZ#52 32598-10-0BZ#66 32598-13-3BZ#77 37680-73-2BZ#101 32598-14-4BZ#105 31508-00-6BZ#118 57465-28-8 |        | 1.7<br>1.7<br>1.7<br>1.7<br>1.7<br>1.7<br>1.7<br>1.7<br>1.7 | บ<br>บ<br>บ<br>บ           |
| 38380-07-3BZ#128 35065-28-2BZ#138 35065-27-1BZ#153 35065-30-6BZ#170 35065-29-3BZ#180 52663-68-0BZ#187 52663-78-2BZ#195 40186-72-9BZ#206 2051-24-3BZ#209                     |        | 1.7<br>1.7<br>1.7<br>1.7<br>1.7<br>1.7                      | บ<br>บ<br>บ<br>บ<br>บ<br>บ |

FORM I OTHER



The same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the sa

Lab Sample ID: PIBLK\_SCU Client Sample ID: PIBLK\_SCU

: BLANK : SOIL Matrix Sample Type

Injection Date : 04-OCT-2002 09:40 Analyst 

Dilution Factor: 1.00 Column : RTX-5 Data File : 03oct021608-r141.d

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_1.i/100302\_1/03OCT021608.b/32CONG\_3327RTX5\_RAW.m Reported : 17-Oct-2002 10:24 rrm

Peaks

| •  |     |          |                  | 20       |        |               |             |         |        | <del></del>              |   |
|----|-----|----------|------------------|----------|--------|---------------|-------------|---------|--------|--------------------------|---|
|    |     | _        |                  |          | _      |               |             | Extract |        |                          |   |
|    | Pea |          | Peak             | Expected | Delta  |               |             | Conc.   | 77.000 | Peak Identificatio       | _ |
|    | No  |          | RT               | RT       | RT     | Area          | Height      | (ppb)   | Flags  | Peak Identificatio       |   |
|    |     | 1        | 0.893            |          |        | 179726        | 27276       |         |        |                          |   |
|    |     | 2        | 3.030            |          |        | 260           | 59          |         |        |                          |   |
|    |     | 3        | 3.321            |          |        | 1158          | 289         |         |        |                          |   |
|    |     | 4        | 3.553            |          |        | 563           | 142         |         |        |                          |   |
|    |     | 5        | 3.771            |          |        | 7336          | 2522        |         |        |                          |   |
|    |     | 6        | 3.946            |          |        | 425           | 122         |         |        |                          |   |
|    |     | 7        | 4.298            |          |        | 786           | 150         |         |        |                          |   |
|    |     | 8<br>9   | 4.396            |          |        | 3483<br>1995  | 1237<br>587 |         | . 1    |                          |   |
| \$ |     | 10       | 4.999            | 5.001    | -0.002 | 194147        | 77368       | 24.5968 |        | Tetrachloro-meta-xylene  |   |
| ٧  |     | 11       | 5.234            | 3.001    | 0.002  | 1695          | 257         | 21.5700 |        | rectacitions mean rytone |   |
|    |     | 12       | 5.402            |          |        | 790           | 143         |         |        |                          |   |
|    |     | 13       | 5.579            |          |        | 2893          | 855         |         |        |                          |   |
|    |     | 14       | 6.038            |          |        | 421           | 115         |         |        |                          |   |
|    |     | 15       | 7.056            |          |        | 586           | 159         |         |        |                          |   |
|    |     | 16       | 7.395            |          |        | 670           | 222         |         |        |                          |   |
|    |     | 17       | 7.765            |          |        | 927           | 243         |         |        |                          |   |
|    |     | 18       | 7.927            |          |        | 212           | 60          |         |        |                          |   |
|    |     | 19       | 9.115            |          |        | 221           | 69          |         |        |                          |   |
|    |     | 20<br>21 | 9.252<br>9.465   |          |        | 1648<br>764   | 232<br>139  |         |        |                          |   |
|    |     | 22       | 9.662            |          |        | 512           | 101         |         |        |                          |   |
|    |     | 23       | 12.205           |          |        | 328           | 82          |         |        |                          |   |
|    |     | 24       | 12.451           |          |        | 679           | 121         |         |        |                          |   |
|    |     | 25       | 13.324           |          |        | 1297          | 197         |         |        |                          |   |
|    |     | 26       | 13.834           |          |        | 1875          | 109         | ·       |        |                          |   |
|    |     | 27       | 14.836           |          |        | 464           | 96          |         |        |                          |   |
|    |     | 28       | 15.448           |          |        | 709           | 123         |         |        |                          |   |
|    |     | 29       | 15.743           |          |        | 578           | 113         |         |        |                          |   |
|    |     | 30       | 16.002           |          |        | 2324          | 302         |         |        |                          |   |
|    |     | 31       | 16.330           |          |        | 41602<br>2515 | 2984<br>312 |         |        |                          |   |
|    |     | 32<br>33 | 17.325<br>18.013 |          |        | 1285          | 252         |         |        |                          |   |
|    | 3   | 34       | 18.148           |          |        | 804           | 179         |         |        |                          |   |
|    |     | 35       | 18.409           |          |        | 1204          | 227         |         |        |                          |   |
|    |     | 36       | 18.649           |          |        | 1189          | 224         |         |        |                          |   |
|    |     | 37       | 18.775           |          |        | 1163          | 179         |         |        |                          |   |
|    |     | 38       | 19.134           |          |        | 850           | 150         |         |        |                          |   |
|    |     | 39       | 19.777           |          |        | 737           | 165         |         |        |                          |   |
|    |     | 40       | 19.901           |          |        | 1123          | 183         |         |        |                          |   |
|    |     | 41       | 20.189           |          |        | 1181          | 185         |         |        |                          |   |
|    |     | 42       | 20.779           |          |        | 3475          | 474<br>209  |         |        |                          |   |
|    |     | 43<br>44 | 21.938<br>22.271 |          |        | 1879<br>1775  | 209<br>320  |         |        |                          |   |
| \$ | :   | 45       | 22.2/1           | 22.559   | -0.013 | 208988        | 38651       | 25.2359 |        | BZ#198                   |   |
| 7  |     | 46       | 23.823           | ~~       | 3.013  | 1709          | 281         | 25.255  |        |                          |   |
|    |     | 47       | 24.541           |          |        | 2334          | 342         |         |        |                          |   |
|    |     | 48       | 27.640           |          |        | 2250          | 401         |         |        |                          |   |
|    |     | 49       | 27.866           |          |        | . 607         | 98          |         |        |                          |   |
|    |     | 50       | 29.169           |          |        | 13434         | 826         |         |        |                          |   |
|    |     | 51       | 31.142           |          |        | 342           | 88          |         |        |                          |   |
|    |     | 52       | 32.226           |          |        | 2594          | 720         |         |        |                          |   |
|    |     | 53       | 32.574           |          |        | 1730          | 273         |         |        |                          |   |
|    |     | 54       | 32.793           |          |        | 7489          | 987         |         |        |                          |   |
|    |     | 55       | 33.507           |          |        | 13889         | 2997        | 1285    |        |                          |   |
|    |     |          |                  |          |        |               |             | 1265    |        |                          |   |

The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s

## STL Burlington - Target GC Injection Report

Flags: A - Peak quantitates above calibration range

- a Peak quantitates below reporting limit
- H User selected alternate compound hit
- $\ensuremath{\mathrm{M}}$  Peak manually integrated or manually identified
- R Peak fails recovery
  U User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

| Target | Compounds |
|--------|-----------|
|--------|-----------|

| Peak    | Expected |                         |
|---------|----------|-------------------------|
| RT      | RT       | Target Compound         |
| ======= |          |                         |
| 4.999   | 5.001    | Tetrachloro-meta-xylene |
|         | 5.761    | BZ#8                    |
|         | 6.701    | BZ#18                   |
|         | 7.925    | BZ#28                   |
|         | 8.984    | BZ#52                   |
|         | 9.667    | BZ#44                   |
|         | 11.243   | BZ#66                   |
|         | 12.207   | BZ#101                  |
|         | 13.752   | BZ#77                   |
|         | 14.938   | BZ#118                  |
|         | 15.993   | BZ#153                  |
|         | 16.155   | BZ#105                  |
|         | 17.328   | BZ#138                  |
|         | 17.762   | BZ#126                  |
|         | 18.647   | BZ#128                  |
|         | 20.781   | BZ#180                  |
|         | 22.271   | BZ#170                  |
| 22.546  | 22.559   | BZ#198                  |
|         | 24.552   | BZ#195                  |
|         | 27.655   | BZ#206                  |
|         | 29.180   | BZ#209                  |
|         |          |                         |

|                     | Y (x10^5)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 7                                                                                             |              |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|--------------|
| 0.1                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                               |              |
| j4                  | (0,940)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                               |              |
| N-                  | G.946)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                               |              |
| ٠                   | pt2.930)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                               |              |
| - 6                 | rt3.509)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                               |              |
| gi-                 | 13.948)<br>- (4.065)<br>- (4.065)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                               |              |
| 3                   | 76,582) Tetrachloro-meta-xylene (5,391)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | RAH CHAM                                                                                      | Ļ            |
|                     | 56,029)<br>56,289)<br>56,619)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Matrix<br>Analys<br>Instru<br>Column<br>Column<br>Integr<br>Method<br>Report                  | Lab          |
| 7 55                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Matrix Analyst Instrument Column Integrator Method Reported                                   | Sample       |
| i.                  | TS.024>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ent                                                                                           | ple          |
|                     | <u>5</u> C9.543>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                               |              |
| 10                  | 1510.496)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                               | ID:          |
| #:                  | <del>(704.398)</del>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | SOIL 3327 RTX- Falc /var 17-0                                                                 | ΡIJ          |
| 15-                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | SOIL  3327_2.i RTX-CLPII Falcon /var/chem/3 17-Oct-2002                                       | PIBLK.       |
| చ-                  | t3.054)<br>(J.3.389)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2.i<br>LPI<br>che<br>t-2                                                                      | _scu         |
| 7.                  | <del>7</del> 83,941)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                               | ď            |
| 15                  | \[\text{\C15.419}\]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | - ω 1                                                                                         |              |
| 16                  | [16.463)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 27_2.                                                                                         |              |
| 17                  | E15:2823                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1 / i                                                                                         |              |
| 16-                 | 1217-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5663<br>1717-5 | Entre                                                                                         | C            |
| 150                 | (18.744)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Sampl<br>Injec<br>Dilut<br>Data<br>Compou<br>100302                                           | Client       |
| 19 20<br>Time (Hin) | 7(19.697)<br>513-2923<br>520.475)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                               |              |
| . 12                | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Sample Type Injection D. Dilution Fa Dilution Faile Compound Sul 100302_1/030 rm              | Sample       |
| 8-                  | 721.901)<br>722.468)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | pe<br>1 Date<br>Factor<br>Sublis<br>300CT02                                                   | ple          |
| ಜ-                  | T22 282)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Type : BL<br>ion Date : 04<br>on Factor : 1.<br>ile : 03<br>ind Sublist: EN<br>1/030CT021608. | Ħ            |
| <u>%</u> -          | \$24.347\                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0 H O H O H                                                                                   | l "          |
| 웛                   | 32 <b>4</b> 198 (24.660)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | BLANK<br>04-OC'<br>1.00<br>03oct<br>ENVNE'<br>8.b/3                                           | IBI          |
| 26-                 | <u>(2</u> 5.844)<br><u>(2</u> 6.409)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | OCT-<br>StOX                                                                                  | λ,<br>,<br>, |
| 27-                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | -20<br>216<br>20N                                                                             | PIBLK_SCU    |
| 8-                  | (28,010)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 02<br>08-                                                                                     |              |
| 29-                 | (28,803)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | BLANK 04-OCT-2002 09:40 1.00 03oct021608-r141.d ENVNET 8.b/32CONG_3327RTXCLPII_RAW.m          |              |
| 30-                 | ₹29.796)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | :40<br>11.<br>7RT                                                                             |              |
| 报                   | 730.745)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | XCI<br>q                                                                                      |              |
| <b>12</b>           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | IIG                                                                                           |              |
| ដ-                  | \$33:232}                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ا ا                                                                                           |              |
| <u>پ</u>            | (E34,103)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1. W.                                                                                         |              |
| <b>u</b> .          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | n<br>                                                                                         |              |
| <u>ي</u>            | \$C35.635>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                               |              |
| 3                   | i •                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                               |              |
| 37 38               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                               |              |
| 39                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                               |              |
| 8                   | - 0267                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                               |              |
|                     | <b>♥</b> /                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                               |              |

Lab Sample ID: PIBLK SCU Client Sample ID: PIBLK SCU

Matrix : SOIL

Sample Type : BLANK
Injection Date : 04-OCT-2002 09:40
Dilution Factor : 1.00
Data File Analyst 

Column : RTX-CLPII Data File : 03oct021608-r141.d

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_2.i/100302\_1/030CT021608.b/32CONG\_3327RTXCLPII\_RAW.m

Reported : 17-Oct-2002 10:24 rrm

|             |                  |                | <del> </del> |              | Pe         | aks                       |       |                                         |
|-------------|------------------|----------------|--------------|--------------|------------|---------------------------|-------|-----------------------------------------|
| Peak<br>No. | Peak<br>RT       | Expected<br>RT | Delta<br>RT  | Area         | Height     | Extract<br>Conc.<br>(ppb) | Flags | Peak Identification                     |
|             |                  |                |              |              | ======     |                           | ====  | ======================================= |
| 1 2         | 0.940            |                |              | 233366       | 28157      |                           |       |                                         |
| 3           | 2.930            |                |              | 487<br>375   | 47<br>98   |                           |       |                                         |
| 4           | 3.509            |                |              | 1021         | 309        |                           |       |                                         |
| 5           | 3.848            |                |              | 1400         | 214        |                           |       |                                         |
| 6           | 4.065            |                |              | 12494        | 3348       |                           |       |                                         |
| 7           | 4.427            |                |              | 688          | 158        |                           |       |                                         |
| 8           | 4.602            |                |              | 1389         | 289        |                           |       |                                         |
| 9           | 4.699            |                |              | 4549         | 1479       |                           | e ==  |                                         |
| 10          | 5.391            | 5.391          | 0.000        | 251377       | 89612      | 24.0577                   |       | Tetrachloro-meta-xylene                 |
| 11          | 5.582            |                |              | 3315         | 820        |                           |       |                                         |
| 12          | 6.029            |                |              | 3721         | 906        |                           |       |                                         |
| 13          | 6.258            |                |              | 2311         | 801        |                           |       |                                         |
| 14          | 6.619            |                |              | 457          | 92         |                           |       |                                         |
| 15          | 8.024            |                |              | 658          | 151        |                           |       |                                         |
| 16          | 8.565            |                |              | 805          | 222        |                           |       |                                         |
| 17          | 9.543            |                |              | 2638         | 544        |                           |       |                                         |
| 18          | 10.496           |                |              | 1320         | 179        |                           |       |                                         |
| 19          | 11.309           |                |              | 263          | 81         |                           |       |                                         |
| 20<br>21    | 11.396<br>13.054 |                |              | 3023         | 491        |                           |       |                                         |
| 22          | 13.034           |                |              | 440<br>1982  | 82<br>270  |                           |       |                                         |
| 23          | 13.941           |                |              | 686          | 123        |                           |       |                                         |
| 24          | 15.419           |                |              | 1177         | 205        |                           |       |                                         |
| 25          | 16.463           |                |              | 788          | 147        |                           |       |                                         |
| 26          | 16.949           |                |              | 741          | 128        | •                         |       |                                         |
| 27          | 17.084           |                |              | 1183         | 156        |                           |       |                                         |
| 28          | 17.660           |                |              | 1068         | 175        |                           |       |                                         |
| 29          | 17.789           |                |              | 1126         | 193        |                           |       |                                         |
| 30          | 17.988           |                |              | 2750         | 359        |                           |       |                                         |
| 31          | 18.744           |                |              | 2769         | 225        |                           |       |                                         |
| 32          | 19.230           |                |              | 48484        | 4770       |                           |       |                                         |
| 33          | 19.697           |                |              | 8000         | 654        |                           |       |                                         |
| 34          | 19.999           |                |              | 2589         | 413        |                           |       |                                         |
| 35          | 20.212           |                |              | 2642         | 402        |                           |       |                                         |
| 36          | 20.475           |                |              | 2904         | 351        |                           |       |                                         |
| 37          | 21.069           |                |              | 1867         | 262        |                           |       |                                         |
| 38<br>39    | 21.455           |                |              | 1896         | 302        |                           |       |                                         |
| 40          | 21.901<br>22.468 |                |              | 973          | 195        |                           |       |                                         |
| 41          | 22.787           |                |              | 2918<br>1265 | 364<br>213 |                           |       |                                         |
| 42          | 22.885           |                |              | 2075         | 307        |                           |       |                                         |
| 43          | 23.107           |                |              | 4482         | 624        |                           |       |                                         |
| 44          | 24.317           |                |              | 2179         | 338        |                           |       |                                         |
| 45          | 24.479           |                |              | 1547         | 257        |                           |       |                                         |
| 46          | 24.660           | 24.678         | -0.018       | 316945       | 58202      | 24.3741                   |       | BZ#198                                  |
| 47          | 24.988           |                |              | 5114         | 647        | · <b>- · - ·</b>          |       | <del>-</del>                            |
| 48          | 25.844           |                |              | 1403         | 188        |                           |       |                                         |
| 49          | 26.409           |                |              | 2362         | 364        |                           |       |                                         |
| 50          | 27.185           |                |              | 2068         | 390        |                           |       |                                         |
| 51          | 28.010           |                |              | 965          | 140        |                           |       |                                         |
| 52          | 28.803           |                |              | 3438         | 242        |                           |       |                                         |
| 53          | 29.796           |                |              | 5517         | . 890      |                           |       |                                         |
| 54          | 30.745           |                |              | 2918         | 632        | 268                       | М     |                                         |
| 55          | 33.097           |                |              | 4649         | - E21      | $\alpha c \alpha$         |       |                                         |

# STL Burlington - Target GC Injection Report

|       |        |          |       |       |        | Extract |       |                                         |
|-------|--------|----------|-------|-------|--------|---------|-------|-----------------------------------------|
| Peak  | Peak   | Expected | Delta |       |        | Conc.   |       |                                         |
| No.   | RT     | RT       | RT    | Area  | Height | (ppb)   | Flags | Peak Identification                     |
| ===== |        |          |       |       |        |         |       | *************************************** |
| 56    | 33.292 |          |       | 4978  | 622    |         |       |                                         |
| 57    | 34.103 |          |       | 4798  | 553    |         |       |                                         |
| 58    | 34.505 |          |       | 2958  | 463    |         |       |                                         |
| 59    | 34.620 |          |       | 18474 | 2433   |         |       | A 1                                     |
| 60    | 35.535 |          |       | 6122  | 982    |         |       |                                         |

Flags: A - Peak quantitates above calibration range

a - Peak quantitates below reporting limit

H - User selected alternate compound hit

M - Peak manually integrated or manually identified

R - Peak fails recovery

 ${\tt U}$  - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

| Targe | + 0 | '~~~~    | 124  |
|-------|-----|----------|------|
| large | L   | וטטוווט. | anas |

| Peak<br>RT | Expected<br>RT | Target Compound            |
|------------|----------------|----------------------------|
|            | =======        | ************************** |
| 5.391      | 5.391          | Tetrachloro-meta-xylene    |
|            | 6.592          | BZ#8                       |
|            | 7.698          | BZ#18                      |
|            | 9.137          | BZ#28                      |
|            | 10.341         | BZ#52                      |
|            | 11.312         | BZ#44                      |
|            | 13.056         | BZ#66                      |
|            | 13.914         | BZ#101                     |
|            | 16.080         | BZ#77                      |
|            | 17.075         | BZ#118                     |
|            | 17.995         | BZ#153                     |
|            | 18.720         | BZ#105                     |
|            | 19.713         | BZ#138                     |
|            | 20.225         | BZ#126                     |
|            | 21.462         | BZ#128                     |
|            | 23.115         | BZ#180                     |
| 24.660     | 24.678         | BZ#198                     |
|            | 25.004         | BZ#170                     |
|            | 27.203         | BZ#195                     |
|            | 29.805         | BZ#206                     |
|            | 30.754         | BZ#209                     |

## FORM 1 OTHER ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

O8LCS

Lab Name: STL BURLINGTON Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.:

SDG No.: 89891

Matrix: (soil/water) SOIL

Lab Sample ID: O8LCS

Sample wt/vol:

30.0 (g/mL) G

Lab File ID: 030CT021608-R021

% Moisture: 0

decanted: (Y/N) N

Date Received: \_\_\_\_

Extraction: (SepF/Cont/Sonc) SOXH

Date Extracted: 09/26/02

Concentrated Extract Volume: 10(mL) Date Analyzed: 10/04/02

CAS NO.

Injection Volume: 1.0(uL)

COMPOUND

Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: \_\_\_ Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s

| 34883-43-7BZ#8       29         37680-65-2BZ#18       29         7012-37-5BZ#28       28         41464-39-5BZ#44       29         35693-99-3BZ#52       29         32598-10-0BZ#66       28         32598-13-3BZ#77       28         37680-73-2BZ#101       29         32598-14-4BZ#105       28         31508-00-6BZ#118       28         57465-28-8BZ#126       28         38380-07-3BZ#128       29         35065-28-2BZ#138       29 | 37680-65-2BZ#18       29         7012-37-5BZ#28       28         41464-39-5BZ#44       29         35693-99-3BZ#52       29         32598-10-0BZ#66       28         32598-13-3BZ#77       28         37680-73-2BZ#101       29         32598-14-4BZ#105       28         31508-00-6BZ#118       28         57465-28-8BZ#126       28         38380-07-3BZ#128       29      | 2.2.2                                                | 4 4 4                              | (ug, | , i or ag, i | .g/ 06/10 | 3                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|------------------------------------|------|--------------|-----------|------------------|
| 32598-10-0BZ#66       28         32598-13-3BZ#77       28         37680-73-2BZ#101       29         32598-14-4BZ#105       28         31508-00-6BZ#118       28         57465-28-8BZ#126       28         38380-07-3BZ#128       29         35065-28-2BZ#138       29                                                                                                                                                                    | 32598-10-0BZ#66       28         32598-13-3BZ#77       28         37680-73-2BZ#101       29         32598-14-4BZ#105       28         31508-00-6BZ#118       28         57465-28-8BZ#126       28         38380-07-3BZ#128       29         35065-28-2BZ#138       29         35065-30-6BZ#153       29         35065-29-3BZ#180       28         52663-68-0BZ#187       29 | 37680-65-2<br>7012-37-5<br>41464-39-5                | BZ#18<br>BZ#28<br>BZ#44            |      |              | £ .       | 29<br>28<br>29   |
| 57465-28-8BZ#126 28 P<br>38380-07-3BZ#128 29<br>35065-28-2BZ#138 29                                                                                                                                                                                                                                                                                                                                                                      | 57465-28-8BZ#126       28         38380-07-3BZ#128       29         35065-28-2BZ#138       29         35065-30-6BZ#153       29         35065-30-6BZ#170       28         35065-29-3BZ#180       28         52663-68-0BZ#187       29                                                                                                                                       | 32598-10-0<br>32598-13-3<br>37680-73-2<br>32598-14-4 | BZ#66<br>BZ#77<br>BZ#101<br>BZ#105 |      |              |           | 28<br>28<br>29   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                          | 35065-30-6BZ#170<br>35065-29-3BZ#180<br>52663-68-0BZ#187<br>28<br>P                                                                                                                                                                                                                                                                                                         | 57465-28-8<br>38380-07-3<br>35065-28-2               | BZ#126<br>BZ#128<br>BZ#138         |      |              |           | 28 P<br>29<br>29 |

FORM I OTHER

Client Sample ID: O8LCS

The same of the same of the same of

Lab Sample ID: 08LCS

|                                                  | , , , , , , , , , , , , , , , , , , ,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                           |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| (0,891)                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                           |
| (T. 680)                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                           |
| (1.90)<br>-H.,90)<br>17.321)<br>54.69%)          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                           |
| 元·编辑》<br>(3.551)<br>元·3.551)                     | e e                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                           |
| - 15,941)<br>- 15,942)<br>- 15,941)<br>- 15,941) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                           |
| E(5,579)                                         | Tetrachiore neto kylene (4,996)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | H 9 1 0 1 2 2                                                                             |
| - 46.036)<br>- 26:3513                           | BZ#8 (5.754)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Matrix Analyst Instrument Column Integrator Method Reported                               |
| 17.098)<br>17.395)<br>17.451)                    | BZ#18 (6.694)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | riz<br>lys<br>tru<br>umr<br>egn<br>hoc<br>ort                                             |
| (F).(%1)                                         | B2#28 (7,918)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ted                                                                                       |
|                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | or nt                                                                                     |
| 5(10,132)                                        | BZ#44 (9,660)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                           |
| £(10,132)<br>£(10,132)<br>£(10,132)              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                           |
| <del>(11</del> 2.7932)                           | B2#66 (11.234)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | SOIL 3327_1 RTX-5 Falcon /var/c 17-Oct                                                    |
|                                                  | BZ#101 (12,201)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 7 1<br>-5<br>con                                                                          |
|                                                  | B2877 (13,741)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 327 1.i<br>:TX-5<br>'alcon<br>var/chem/3                                                  |
| 7(14,224)<br>(14,555)                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3327_1.i<br>3327_1.i<br>?TX-5<br>?Talcon<br>/var/chem/332<br>L7-Oct-2002_1                |
|                                                  | #Z#118 ₹₹#1329(14.816)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 327<br>13                                                                                 |
| (15,729)                                         | <b>151158-416:192</b> 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | •• }                                                                                      |
| f <u>[</u>                                       | B2M30 (17, 321)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ω <sub>μ</sub> .                                                                          |
|                                                  | BZ#126 (17,749)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | rrm<br>DD<br>DD<br>DD<br>DD<br>SS                                                         |
|                                                  | #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.161) @ #2#187 (18.1 | Sample Ty Injection Dilution Data File Compound /100302_1/c rrm                           |
| (19,445)                                         | 924456 - (1.9, 875),<br>924456 - (1.9, 875),<br>924457 - (20, 163)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                           |
| <b>≤</b> (20.529)                                | DZ#400 (20,772 S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Sample Tyn Injection I Dilution I Dilution I Data File Compound (100302_1/03rm            |
|                                                  | BZ8169 (21.841)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Type<br>on D<br>on Fa<br>ld Su<br>./030                                                   |
|                                                  | BZ#198 (22,548)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Type : LC<br>on Date : 04<br>of Factor : 1.<br>e : 03<br>{ Sublist: EN<br>030CT021608.    |
| (22,998)<br>(23,222)                             | * *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ist<br>21                                                                                 |
|                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 8 H O H O F                                                                               |
| 2(24,898)                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | p ₹ o o i a                                                                               |
| <b>≥</b> (25,671)                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | OCT-<br>OCT-<br>OCT02<br>NET<br>0/320                                                     |
|                                                  | 1 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | -20<br>216<br>CON                                                                         |
| 729 740)                                         | ######################################                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 04-OCT-2002 00:40<br>1.00<br>1.00<br>03oct021608-r021.d<br>ENVNET<br>08.b/32CONG_3327RTX5 |
| ₹28;328}<br>                                     | 538309 (29,474)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 00<br>-r0<br>332                                                                          |
|                                                  | 7,727                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 00:40<br>r021.<br>327RT                                                                   |
| (30.816)<br>(31.151)                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | , X5                                                                                      |
| 5(32 228)                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | , RA                                                                                      |
| 日子:553                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | OCT-2002 00:40<br>0<br>ct021608-r021.d<br>NET<br>/32CONG_3327RTX5_RAW.m                   |
| ₹32.982}<br>(₹33.279)<br>(₹33.509)               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ា ។                                                                                       |
| 4- ±34.039)<br>±34.372)                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                           |
| 134,986)                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                           |
| (36,269)                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | *                                                                                         |
| d <sup>±</sup>                                   | • 1 1 No. 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                           |
| g- [                                             | ·                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                           |
| å-<br>  }                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                           |
| 1                                                | 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                           |
| <b>6</b> .                                       | ~ ~ 0271                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                           |

Lab Sample ID: O8LCS Client Sample ID: 08LCS

: SOIL Matrix

Sample Type : LCS
Injection Date : 04-OCT-2002 00:40
Dilution Factor : 1.00 Analyst

Instrument : 3327\_1.i

Column : RTX-5 Data File : 03oct021608-r021.d

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_1.i/100302\_1/030CT021608.b/32CONG\_3327RTX5\_RAW.m

Reported : 17-Oct-2002 13:48 rrm

|             | . 1              |                  |                  |                  |                   | Extract        |       |                                        |
|-------------|------------------|------------------|------------------|------------------|-------------------|----------------|-------|----------------------------------------|
| Peak<br>No. | Peak<br>RT       | Expected<br>RT   | Delta<br>RT      | Area             | Height            | Conc.<br>(ppb) | Flags | Peak Identification                    |
| ====        |                  | ======           |                  | ======           | =======           | (pp5)          | ===== | ====================================== |
| 1           | 0.891            |                  |                  | 74441            | 8519              |                |       |                                        |
| 2           | 1.157            |                  |                  | 18927            | 2535              |                |       |                                        |
| 3<br>4      | 1.680            |                  |                  | 535              | 118               |                |       |                                        |
| 5           | 1.886<br>1.966   |                  |                  | 1453             | 357               |                |       |                                        |
| 6           | 2.321            |                  |                  | 1061<br>918      | 259<br>160        |                |       |                                        |
| 7           | 2.587            |                  |                  | 2603             | 708               |                |       |                                        |
| 8           | 2.676            |                  |                  | 8286             | 2024              |                |       |                                        |
| 9           | 3.165            |                  |                  | 686              | 169               |                | 18 17 |                                        |
| 10          | 3.239            |                  |                  | 3674             | 1153              |                |       |                                        |
| 11          | 3.314            |                  |                  | 2194             | 516               |                |       |                                        |
| 12          | 3.551            |                  |                  | 1307             | 227               |                |       |                                        |
| 13          | 3.768            |                  |                  | 10398            | 3481              |                |       |                                        |
| 14          | 3.941            |                  |                  | 948              | 204               |                |       |                                        |
| 15          | 4.307            |                  |                  | 594              | 149               |                |       |                                        |
| 16          | 4.396            |                  |                  | 4740             | 1714              |                |       |                                        |
| 17          | 4.690            | 5 003            |                  | 1985             | 708               |                |       |                                        |
| 18<br>19    | 4.996<br>5.579   | 5.001            | -0.005           | 322406           | 127863            | 40.5768        |       | Tetrachloro-meta-xylene                |
| 20          | 5.754            | 5.761            | -0.007           | 4749             | 1270              | 07.7600        |       |                                        |
| 21          | 6.036            | 3.701            | -0.007           | 182002<br>1274   | 61032<br>289      | 87.3679        |       | B2#8                                   |
| 22          | 6.351            |                  |                  | 343              | 90                |                |       |                                        |
| 23          | 6.515            |                  |                  | 289              | 119               |                |       |                                        |
| 24          | 6.694            | 6.701            | -0.007           | 216526           | 68628             | 87.8255        |       | BZ#18                                  |
| 25          | 7.098            |                  |                  | 829              | 151               | 07.0233        |       | D2#10                                  |
| 26          | 7.395            |                  |                  | 963              | 338               | •              |       |                                        |
| 27          | 7.654            |                  |                  | 322              | 112               |                |       |                                        |
| 28          | 7.761            |                  |                  | 1022             | 321               |                |       |                                        |
| 29          | 7.918            | 7.925            | -0.007           | 362749           | 111064            | 84.3386        |       | BZ#28                                  |
| 30          | 8.977            | 8.984            | -0.007           | 281603           | 80562             | 87.4736        |       | BZ#52                                  |
| 31          | 9.115            |                  |                  | 348591           | 92213             |                |       |                                        |
| 32          | 9.660            | 9.667            | -0.007           | 376038           | 102005            | 87.0403        |       | BZ#44                                  |
| 33          | 10.132           |                  |                  | 5119             | 1179              |                |       |                                        |
| 34<br>35    | 10.376<br>10.813 |                  |                  | 310              | 88                |                |       |                                        |
| 36          | 10.813           |                  |                  | 340              | 88                |                |       |                                        |
| 37          | 11.234           | 11.243           | -0.009           | 777<br>406949    | 201<br>96494      | 04 3050        |       | 2214                                   |
| 38          | 11.797           | 11.243           | -0.009           | 2620             | 529               | 84.7950        |       | BZ#66                                  |
| 39          | 11.901           |                  |                  | 6592             | 1213              |                |       |                                        |
| 40          | 12.201           | 12.207           | -0.007           | 392104           | 90275             | 87.3289        |       | BZ#101                                 |
| 41          | 12.890           |                  |                  | 1672             | 364               | 07.0203        |       | 55,101                                 |
| 42          | 13.309           |                  |                  | 819146           | 177841            |                |       |                                        |
| 43          | 13.741           | 13.752           | -0.011           | 304210           | 50890             | 84.7045        |       | BZ#77                                  |
| 44          | 14.224           |                  |                  | 14680            | 1537              |                |       | 21                                     |
| 45          | 14.555           |                  |                  | 3126             | 497               |                |       |                                        |
| 46          | 14.816           |                  |                  | 418835           | 99939             |                |       |                                        |
| 47          | 14.929           | 14.938           | -0.009           | 478993           | 93466             | 85.4173        |       | BZ#118                                 |
| 48          | 15.419           |                  |                  | 589656           | 131406            |                |       |                                        |
| 49          | 15.729           |                  |                  | 15710            | 2523              |                |       |                                        |
| 50          | 15.989           | 15.993           | -0.004           | 887113           | 144357            | 172.873        | R     | BZ#153                                 |
| 51<br>52    | 16.146           | 16.155           | -0.009           | 585317           | 114107            | 84.0502        |       | BZ#105                                 |
| 53          | 17.321<br>17.749 | 17.328<br>17.762 | -0.007<br>-0.013 | 550103           | 116240            | 87.0673        |       | BZ#138                                 |
| 54          | 18.161           | 18.170           | -0.013           | 343687           | 56542             | 84.0790        |       | BZ#126                                 |
| 55          | 18.407           | 10.170           | -0.003           | 510590<br>547956 | 104729<br>-115123 | 88.0989        |       | B2#187                                 |

|       |         |          |        |         |         | Extract |       |        |        |          |                                         |  |
|-------|---------|----------|--------|---------|---------|---------|-------|--------|--------|----------|-----------------------------------------|--|
| Peak  | Peak    | Expected | Delta  |         |         | Conc.   |       |        |        |          |                                         |  |
| No.   | RT      | RT       | RT     | Area    | Height  | (ppb)   | Flags |        | Peak I | dentific | ation                                   |  |
| ===== | ======= |          | ====== | ======= | ======= |         |       |        |        |          | ======================================= |  |
| 56    | 18.638  | 18.647   | -0.009 | 587164  | 130750  | 88.1655 |       | BZ#128 |        |          |                                         |  |
| 57    | 18.749  |          |        | 536960  | 100306  |         |       |        |        |          |                                         |  |
| 58    | 19.445  |          |        | 3281    | 317     |         |       |        |        |          |                                         |  |
| 59    | 19.875  |          |        | 573448  | 115882  |         |       |        | •      |          |                                         |  |
| 60    | 20.163  |          |        | 595916  | 114332  |         |       |        |        |          |                                         |  |
| 61    | 20.529  |          |        | 10854   | 1672    |         |       |        |        |          |                                         |  |
| 62    | 20.772  | 20.781   | -0.009 | 610853  | 122628  | 87.4421 |       | BZ#180 |        |          |                                         |  |
| 63    | 21.841  |          |        | 473573  | 76438   |         |       |        |        |          |                                         |  |
| 64    | 22.260  | 22.271   | -0.011 | 649124  | 128887  | 87.3936 |       | BZ#170 |        |          |                                         |  |
| \$ 65 | 22.548  | 22.559   | -0.011 | 321127  | 61922   | 41.4260 |       | BZ#198 |        |          |                                         |  |
| - 66  | 22.998  |          |        | 11180   | 1734    |         |       |        |        |          |                                         |  |
| 67    | 23.222  |          |        | 2158    | 250     |         |       |        |        |          |                                         |  |
| 68    | 23.807  |          |        | 633204  | 117235  |         |       |        |        |          |                                         |  |
| 69    | 24.541  | 24.552   | -0.011 | 696550  | 136192  | 88.0963 |       | BZ#195 |        |          |                                         |  |
| 70    | 24.898  |          |        | 6545    | 859     |         |       |        |        |          |                                         |  |
| 71    | 25.671  |          |        | 7125    | 1431    |         |       |        |        |          |                                         |  |
| 72    | 27.642  | 27.655   | -0.013 | 698308  | 124566  | 88.1094 |       | BZ#206 |        |          |                                         |  |
| 73    | 28.340  |          |        | 2039    | 331     |         |       |        |        |          |                                         |  |
| 74    | 28.526  |          |        | 191     | 39      |         |       |        |        |          |                                         |  |
| 75    | 29.171  | 29.180   | -0.009 | 630718  | 137060  | 91.3404 |       | BZ#209 |        |          |                                         |  |
| 76    | 30.816  |          |        | 350     | 93      |         |       |        |        |          |                                         |  |
| 77    | 31.151  |          |        | 572     | 96      |         |       |        |        |          |                                         |  |
| 78    | 32.228  |          |        | 3735    | 1177    |         |       |        |        |          |                                         |  |
| 79    | 32.450  |          |        | 879     | 252     |         |       |        |        |          |                                         |  |
| 80    | 32.583  |          |        | 700     | 143     | •       | * 8   |        |        |          |                                         |  |
| 81    | 32.798  |          |        | 3689    | 638     |         |       |        |        |          |                                         |  |
| 82    | 32.982  |          |        | 2260    | 355     |         |       |        |        |          |                                         |  |
| 83    | 33.279  |          |        | 3484    | 334     |         |       |        |        |          |                                         |  |
| 84    | 33.509  |          |        | 9986    | 1893    |         |       |        |        |          |                                         |  |
| 85    | 34.039  |          |        | 641     | 131     |         |       |        |        |          |                                         |  |
| 86    | 34.372  |          |        | 1683    | 444     |         |       |        |        |          |                                         |  |
| 87    | 34.986  |          |        | 517     | 108     |         |       |        |        |          |                                         |  |
| 88    | 36.269  |          |        | 417     | 96      |         |       |        |        |          |                                         |  |
|       |         |          |        |         |         |         |       |        |        |          |                                         |  |

Flags: A - Peak quantitates above calibration range

- a Peak quantitates below reporting limit
- H User selected alternate compound hit
- M Peak manually integrated or manually identified
- R Peak fails recovery
- U User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

| M      | <b>a</b> |    |
|--------|----------|----|
| Target | Compour  | as |

| Peak   | Expected |                         |
|--------|----------|-------------------------|
| RT     | RT       | Target Compound         |
|        |          |                         |
| 4.996  | 5.001    | Tetrachloro-meta-xylene |
| 5.754  | 5.761    | BZ#8                    |
| 6.694  | 6.701    | BZ#18                   |
| 7.918  | 7.925    | BZ#28                   |
| 8.977  | 8.984    | BZ#52                   |
| 9.660  | 9.667    | BZ#44                   |
| 11.234 | 11.243   | BZ#66                   |
| 12.201 | 12.207   | BZ#101                  |
| 13.741 | 13.752   | BZ#77                   |
| 14.929 | 14.938   | BZ#118                  |
| 15.989 | 15.993   | BZ#153                  |
| 16.146 | 16.155   | BZ#105                  |
| 17.321 | 17.328   | BZ#138                  |
| 17.749 | 17.762   | BZ#126                  |
| 18.161 | 18.170   | BZ#187                  |
| 18.638 | 184 647  | BZ#128                  |
| 20.772 | 20.781   | BZ#180                  |
| 22.260 | 22.271   | BZ#170                  |
| 22.548 | 22.559   | BZ#198                  |
| 24.541 | 24.552   | BZ#195                  |
| 27.642 | 27.655   | BZ#206                  |
| 29.171 | 29.180   | (BZ#2090273             |

Reported: 10/17/2002 13:48 rrm 03oct021608-r021.d

| (0.944)                                                                                                                                |                 |             |             |               |                                       |                            |                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------|-------------|---------------|---------------------------------------|----------------------------|----------------------------------------------------------|
| (1,248)                                                                                                                                |                 |             |             |               |                                       |                            |                                                          |
| (2.152)<br>(2.407)                                                                                                                     |                 |             |             |               |                                       |                            |                                                          |
| 13:359}<br>=1:4:369;<br>-25:569                                                                                                        |                 |             |             |               |                                       |                            |                                                          |
| C3.5077                                                                                                                                |                 |             |             |               |                                       |                            |                                                          |
| 2533<br>2533<br>264302)                                                                                                                |                 |             |             |               |                                       |                            |                                                          |
|                                                                                                                                        |                 |             |             |               |                                       |                            |                                                          |
| ≥5.582)<br>=(6.029)                                                                                                                    | <u> </u>        | <del></del> |             |               | Tetnochlore                           | r-neta-nyle                | <del>ne (5</del> ,                                       |
| F(6.029)<br>F(6.258)<br>F6.4111                                                                                                        | <br><del></del> |             | BZ#8 (6.5   | 90)           |                                       |                            |                                                          |
|                                                                                                                                        | <u>.</u>        |             |             | BZ#18 (7,696) |                                       |                            |                                                          |
| (8.180)<br>(8.17)<br>(8.17)<br>(8.798)                                                                                                 |                 |             |             | D2W10 (7,636) |                                       |                            |                                                          |
|                                                                                                                                        | <br><del></del> |             |             |               |                                       | 924                        | <del>20 (9,</del> (                                      |
| 5(9,545)<br>19,858)                                                                                                                    |                 |             |             |               |                                       |                            |                                                          |
|                                                                                                                                        |                 |             |             |               | BZ#52 (10                             | (10,                       | 478)                                                     |
| 711,16R)<br>>(11,551)                                                                                                                  | <br>-           |             |             |               |                                       | BZ#4                       | 4 (11.                                                   |
| L<br>\$12:156}<br>\$12:157}                                                                                                            |                 |             |             |               |                                       |                            |                                                          |
| (12;597)                                                                                                                               | <br>            |             |             |               |                                       | <u></u>                    | <del>(13.</del> (                                        |
|                                                                                                                                        |                 |             |             |               |                                       |                            | <del>- (1</del> 3.9                                      |
| (14.885)                                                                                                                               |                 |             |             |               |                                       | BCWAY                      |                                                          |
| (14.665)                                                                                                                               |                 |             |             |               | · · · · · · · · · · · · · · · · · · · |                            |                                                          |
|                                                                                                                                        |                 |             | BZ#77 (1    | 6.073)        |                                       |                            |                                                          |
| <u>X</u> 16.667)                                                                                                                       | <br>            |             |             |               |                                       |                            |                                                          |
|                                                                                                                                        |                 |             |             |               |                                       |                            |                                                          |
|                                                                                                                                        |                 |             |             |               |                                       | BZ#45                      | 217.0                                                    |
| (19.187)                                                                                                                               |                 |             |             |               |                                       | <del></del>                |                                                          |
| £19.999)                                                                                                                               |                 |             | <del></del> |               |                                       | 92013(                     | <del>- (19.7</del>                                       |
|                                                                                                                                        |                 |             |             | ====          |                                       | P7#100                     | <del>-(20,2</del><br><del>-(20,4</del>                   |
|                                                                                                                                        |                 |             |             |               |                                       |                            | 434-0                                                    |
|                                                                                                                                        |                 |             |             |               |                                       | 97#426                     | -                                                        |
| (21:85Q)<br>(22:284)                                                                                                                   |                 |             |             |               |                                       | 97#126                     |                                                          |
| (21.859)<br>(22.284)                                                                                                                   |                 |             |             |               |                                       |                            | <del>(22,4</del>                                         |
| \$2±:85Q}<br>\$22:284}                                                                                                                 |                 |             |             |               |                                       |                            | <del>(22,4</del>                                         |
| (21:852)<br>(22:284)                                                                                                                   |                 |             |             | BZ#1          | 98 (24,669)                           | 37#160                     | - (22,4)<br>- (23,4)<br>- (23,4)                         |
| (20,221)                                                                                                                               |                 |             |             | BZ#1          | 98 (24,669)                           |                            | - (22,4)<br>- (23,4)<br>- (23,4)                         |
|                                                                                                                                        |                 |             |             | BZ91.         | 98 (24,669)                           | 37#160                     | -(22,4)<br>-(23,4)<br>-(23,4)<br>-(24,4)<br>-(24,4)      |
| (20,221)                                                                                                                               |                 |             |             | BZ#1          | 98 (24,669)                           | 92#190<br>92#170           |                                                          |
| \(\frac{\chi_5,221}{\chi_5,221}\)                                                                                                      |                 |             |             | BZ#1'         | 98 (24,669)                           | 37#160                     |                                                          |
| T28,046)<br>(28,300)                                                                                                                   |                 |             |             | BZe1          |                                       | 92#190<br>92#170           |                                                          |
| \(\frac{\chi_5,221}{\chi_5,221}\)                                                                                                      |                 |             |             | BZ#1          | . (24,669)                            | 92#190<br>92#170           |                                                          |
| 725,221)<br>125,924)<br>128,016)<br>5(28,300)<br>728,826)                                                                              |                 |             |             | BZ#1'         | 98 (24,669)                           | 92#190<br>92#170           |                                                          |
| 725,221)<br>125,924)<br>128,016)<br>5(28,300)<br>728,826)                                                                              |                 |             |             | BZ61:         |                                       | 924190<br>924170<br>924190 | 422,44<br>423,67<br>423,44<br>424,48<br>424,99<br>426,40 |
| 725,221)<br>125,924)<br>128,016)<br>5(28,300)<br>728,826)                                                                              |                 |             |             | BZ011         | . (24,669)                            | 928196<br>928196           | 422,44<br>423,67<br>423,44<br>424,48<br>424,99<br>426,40 |
| (25,221)<br>(25,924)<br>(28,300)<br>(28,826)<br>(29,484)<br>(31,778)<br>(32,182)                                                       |                 |             |             | BZ#1          | 98 (24,669)                           | 928196<br>928195           | 422,44<br>423,67<br>423,44<br>424,48<br>424,99<br>426,40 |
| 725,221) 125,924) 128,016) 5(28,300) 128,826) 129,484)                                                                                 |                 |             |             | BZ#1'         | 98 (24,669)                           | 928196<br>928195           | 422,44<br>423,67<br>423,44<br>424,48<br>424,99<br>426,40 |
| (25,221)<br>(25,924)<br>(28,300)<br>(28,826)<br>(29,484)<br>(31,778)<br>(32,182)                                                       |                 |             |             | B261          | . (24,669)                            | 928196<br>928195           | 422,44<br>423,67<br>423,44<br>424,48<br>424,99<br>426,40 |
| (28,016)<br>(28,300)<br>(28,300)<br>(28,300)<br>(28,826)<br>(29,484)<br>(31,778)<br>(32,182)<br>(32,891)<br>(32,332)                   |                 |             |             | BZ91          | 98 (24,669)                           | 928196<br>928195           | 422,44<br>423,67<br>423,44<br>424,48<br>424,99<br>426,40 |
| (25,221) (25,924) (28,300) (28,826) (29,484) (31,778) (12,182) (33,332) (33,329) (34,624)                                              |                 |             |             | RZ61:         | 98 (24,669)                           | 928196<br>928195           | 422,44<br>423,67<br>423,44<br>424,48<br>424,99<br>426,40 |
| (25,221) (25,924) (28,300) (28,826) (29,484) (31,778) (32,182) (33,332) (33,624) (34,624) (35,832)                                     |                 |             |             | BZ#1          | 98 (24,669)                           | 928196<br>928195           | 422,44<br>423,67<br>423,44<br>424,48<br>424,99<br>426,40 |
| (25,221) (25,924) (28,300) (28,826) (29,484) (31,778) (12,182) (33,332) (33,329) (34,624)                                              |                 |             |             | BZ61'         |                                       | 928196<br>928195           | 422,44<br>423,67<br>423,44<br>424,48<br>424,99<br>426,40 |
| (25,221) (25,924) (28,300) (28,826) (29,484) (31,778) (32,182) (33,332) (33,624) (34,624) (35,832)                                     |                 |             |             | BZ91          | . (24,669)                            | 928196<br>928195           | 422,44<br>423,67<br>423,44<br>424,48<br>424,99<br>426,40 |
| (25,221) (25,924) (25,924) (26,300) (28,826) (29,484) (31,778) (32,182) (33,322) (33,829) (34,624) (35,332) (36,443) (35,632) (36,413) |                 |             |             | RZ61:         | 98 (24,669)                           | 928196<br>928195           | 422,44<br>423,67<br>423,44<br>424,48<br>424,99<br>426,40 |
| (25,221) (25,924) (25,924) (26,300) (28,826) (29,484) (31,778) (32,182) (33,322) (33,829) (34,624) (35,332) (36,443) (35,632) (36,413) |                 |             |             | BZ#1          | 98 (24,669)                           | 928196<br>928195           | 422,44<br>423,67<br>423,44<br>424,48<br>424,99<br>426,40 |

| Matrix Analyst Instrument Column Integrator Method Reported                              | Lab Sample ID: 08LCS    |
|------------------------------------------------------------------------------------------|-------------------------|
| : SOIL<br>: 3327_2.i<br>: RTX-CLPI:<br>: Falcon<br>: /var/chen<br>: 17-Oct-20            | D: OBLC                 |
| SOIL  Samp Inje 3327_2.i RTX-CLPII Palcon /var/chem/3327_2.i/10030 17-Oct-2002 13:48 rrm |                         |
| SOIL Sample Type : LCS Injection Date : 04-OCT-2002 00:40 3327_2.i                       | Client Sample ID: O8LCS |
| .PII_RAW.m                                                                               |                         |

TO SEE SEE SEE SEE SEE SEE SEE SEE

Lab Sample ID: O8LCS Client Sample ID: O8LCS

Matrix : SOIL Sample Type : LCS

Analyst : [m.]
Instrument : 3327\_2.i
Column : DTV Injection Date : 04-OCT-2002 00:40

Dilution Factor : 1.00

: RTX-CLPII Data File : 03oct021608-r021.d

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_2.i/100302\_1/03OCT021608.b/32CONG\_3327RTXCLPII\_RAW.m

Peaks

Reported : 17-Oct-2002 13:48 rrm

|        |        |          |        |                |              | Extract  |       |                         |  |
|--------|--------|----------|--------|----------------|--------------|----------|-------|-------------------------|--|
| Peak   | Peak   | Expected | Delta  |                |              | Conc.    |       |                         |  |
| No.    | RT     | RT       | RT     | Area           | Height       | (ppb)    | Flags | Peak Identifica         |  |
|        |        | ~~~~~    | ====== |                |              | ======== | ===== |                         |  |
| 1<br>2 | 0.944  |          |        | 93193<br>23410 | 8874<br>2346 |          |       |                         |  |
| 3      | 1.248  |          |        | 625            | 155          |          |       |                         |  |
| 4      | 1.745  |          |        | 248            | 100          |          |       |                         |  |
| 5      | 1.815  |          |        | 1147           | 353          |          |       |                         |  |
| 6      | 1.904  |          |        | 1065           | 295          |          |       |                         |  |
| 7      | 2.152  |          |        | 324            | 71           |          |       |                         |  |
| 8      | 2.407  |          |        | 258            | 54           |          |       |                         |  |
| 9      | 2.740  |          |        | 490            | 129          |          | * *   |                         |  |
| 10     | 2.904  |          |        | 1179           | 180          |          |       |                         |  |
| 11     | 3.128  |          |        | 3042           | 928          |          |       |                         |  |
| 12     | 3.234  |          |        | 8273           | 2540         |          |       |                         |  |
| 13     | 3.392  |          |        | 648            | 157          |          |       |                         |  |
| 14     | 3.507  |          |        | 1802           | 501          |          |       |                         |  |
| 15     | 3.846  |          |        | 1186           | 294          |          |       |                         |  |
| 16     | 3.955  |          |        | 3984           | 1410         |          |       |                         |  |
| 17     | 4.065  |          |        | 14935          | 4560         |          |       |                         |  |
| 18     | 4.263  |          |        | 1513           | 396          |          |       |                         |  |
| 19     | 4.424  |          |        | 1098           | 241          |          |       |                         |  |
| 20     | 4.611  |          |        | 736            | 139          |          |       |                         |  |
| 21     | 4.702  |          |        | 6099           | 1945         |          |       |                         |  |
| \$ 22  | 5.391  | 5.391    | 0.000  | 437086         | 150897       | 40.0771  |       | Tetrachloro-meta-xylene |  |
| 23     | 5.582  |          |        | 3642           | 990          |          |       |                         |  |
| 24     | 6.029  |          |        | 3543           | 1086         |          |       |                         |  |
| 25     | 6.258  |          |        | 3546           | 1273         |          |       |                         |  |
| 26     | 6.444  |          |        | 1217           | 445          | •        | •     |                         |  |
| 27     | 6.513  |          |        | 1036           | 437          |          |       |                         |  |
| 28     | 6.590  | 6.592    | -0.002 | 271343         | 75605        | 87.6458  |       | BZ#8                    |  |
| 29     | 7.696  | 7.698    | -0.002 | 342689         | 87020        | 87.9893  |       | BZ#18                   |  |
| 30     | 8.180  |          |        | 702            | 114          |          |       |                         |  |
| 31     | 8.417  |          |        | 449            | 93           |          |       |                         |  |
| 32     | 8.570  |          |        | 1175           | 354          |          |       |                         |  |
| 33     | 8.798  |          |        | 581            | 144          |          |       |                         |  |
| 34     | 9.135  | 9.137    | -0.002 | 557819         | 145208       | 84.9248  |       | BZ#28                   |  |
| 35     | 9.545  |          |        | 8204           | 1078         |          |       |                         |  |
| 36     | 9.858  |          |        | 1276           | 267          |          |       |                         |  |
| 37     | 10.339 | 10.341   | -0.002 | 453942         | 106510       | 87.2602  |       | BZ#52                   |  |
| 38     | 10.478 |          |        | 554109         | 122365       |          |       |                         |  |
| 39     | 11.168 |          |        | 373            | 89           |          |       |                         |  |
| 40     | 11.307 | 11.312   | -0.004 | 613855         | 135128       | 86.6136  |       | BZ#44                   |  |
| 41     | 11.551 |          |        | 12015          | 1885         |          |       |                         |  |
| 42     | 12.156 |          |        | 299            | 75           |          |       |                         |  |
| 43     | 12.347 |          |        | 217            | 69           |          |       |                         |  |
| 44     | 12.451 |          |        | 252            | 76           |          |       |                         |  |
| 4.5    | 12.597 |          |        | 944            | 229          |          |       |                         |  |
| 46     | 12.899 |          |        | 285            | 72           |          |       |                         |  |
| 47     | 13.052 | 13.056   | -0.004 | 656195         | 136209       | 84.1041  |       | BZ#66                   |  |
| 48     | 13.910 | 13.914   | -0.004 | 645923         | 129459       | 87.3124  |       | BZ#101                  |  |
| 49     | 14.885 |          |        | 2003           | 423          |          |       |                         |  |
| 50     | 15.417 |          |        | 1403944        | 223440       |          |       |                         |  |
| 51     | 16.073 | 16.080   | -0.007 | 469164         | 76610        | 83.0690  |       | BZ#77                   |  |
| 52     | 16.667 |          |        | 7455           | 1028         |          |       |                         |  |
| 53     | 16.942 |          |        | 707672         | 148176       |          |       |                         |  |
| 54     | 17.071 | 17.075   | -0.004 | 782118         | 142341       | 85.6614  |       | BZ#118                  |  |
| 55     | 17.649 |          |        | 922332         | 196749       | 0275     |       |                         |  |
|        |        |          |        |                | - 1          | 1/13     |       |                         |  |

# STL Burlington - Target GC Injection Report

|          |                  |          |         |         |         | Extract   |       |            |                                         |
|----------|------------------|----------|---------|---------|---------|-----------|-------|------------|-----------------------------------------|
| Peak     | Peak             | Expected | Delta   |         |         | Conc.     |       |            |                                         |
| No.      | RT               | RT       | RT      | Area    | Height  | (ppb)     | Flags | Pea        | k Identification                        |
| ====     | ======           |          | ======= | ======= | ======= | ========= | ===== | ========== | ======================================= |
| 56       | 17.798           |          |         | 854441  | 160621  |           |       |            |                                         |
| 57       | 17.988           | 17.995   | -0.007  | 791754  | 145728  | 87.3437   |       | BZ#153     |                                         |
| 58       | 18.713           | 18.720   | -0.007  | 860218  | 171453  | 84.2062   |       | BZ#105     |                                         |
| 59       | 19.187           |          |         | 18679   | 2886    |           |       |            |                                         |
| 60       | 19.708           | 19.713   | -0.004  | 922235  | 175085  | 87.0138   |       | BZ#138     |                                         |
| 61       | 19.999           |          |         | 3732    | 711     |           |       |            |                                         |
| 62       | 20.218           | 20.225   | -0.007  | 1380749 | 161575  | 172.653   | R     | BZ#126     |                                         |
| 62       | 20.218           | 20.225   | -0.007  | 1380749 | 161575  | 172.653   | MR    | BZ#187     |                                         |
| 63       | 20.482           |          |         | 979379  | 176558  |           |       |            |                                         |
| 64       | 21.052           |          |         | 846238  | 152209  |           |       |            |                                         |
| 65       | 21.457           | 21.462   | -0.004  | 1026482 | 195355  | 86.8114   |       | BZ#128     |                                         |
| 66       | 21.910           |          |         | 579     | 147     |           |       |            |                                         |
| 67       | 22.034           |          |         | 600     | 134     |           |       |            |                                         |
| 68       | 22.284           |          |         | 600     | 86      |           |       |            |                                         |
| 69       | 22.455           |          |         | 977669  | 183820  |           |       |            |                                         |
| 70       | 22.876           |          |         | 963267  | 182783  |           |       |            |                                         |
| 71       | 23.107           | 23.115   | -0.009  | 1061132 | 192687  | 85.2446   |       | BZ#180     |                                         |
| 72       | 24.450           |          |         | 764820  | 128504  |           |       |            |                                         |
| \$ 73    | 24.669           | 24.678   | -0.009  | 519301  | 95159   | 39.9527   |       | BZ#198     |                                         |
| 74       | 24.995           | 25.004   | -0.009  | 1093291 | 200860  | 85.7738   |       | BZ#170     |                                         |
| 75<br>76 | 25.221           |          |         | 13207   | 2100    |           |       |            |                                         |
| 76       | 25.924           |          |         | 850     | 186     |           |       |            |                                         |
| 77       | 26.403           |          |         | 1095397 | 195934  |           |       |            |                                         |
| 78<br>79 | 27.194           | 27.203   | -0.009  | 1204472 | 213268  | 86.8124   |       | BZ#195     |                                         |
| 79<br>80 | 28.016           |          |         | 482     | 99      |           | 8 11  |            |                                         |
| 81       | 28.300           |          |         | 8999    | 1737    |           |       |            |                                         |
| 82       | 28.826           |          |         | 360     | 54      |           |       |            |                                         |
| 83       | 29.484<br>29.799 | 20 205   |         | 368     | 75      |           |       |            |                                         |
| 84       |                  | 29.805   | -0.007  | 1192612 | 249493  | 87.8054   |       | BZ#206     |                                         |
| 85       | 30.750<br>31.488 | 30.754   | -0.004  | 1083940 | 235648  | 88.1011   |       | BZ#209     |                                         |
| 86       | 31.408           |          |         | 272     | 78      |           |       |            |                                         |
| 87       | 32.182           |          |         | 265     | 40      |           |       |            |                                         |
| 88       | 32.182           |          |         | 894     | 125     |           |       |            |                                         |
| 89       | 33.097           |          |         | 17674   | 2088    |           |       |            |                                         |
| 90       | 33.332           |          |         | 4466    | 595     |           |       |            |                                         |
| 91       | 33.829           |          |         | 6045    | 672     |           |       |            |                                         |
| 92       | 34.624           |          |         | 6391    | 739     |           |       |            |                                         |
| 93       | 35.343           |          |         | 17437   | 2209    |           |       |            |                                         |
| 94       | 35.543           |          |         | 2171    | 286     |           |       |            |                                         |
| 95       | 35.832           |          |         | 3141    | 595     |           |       |            |                                         |
| 96       | 36.413           |          |         | 935     | 152     |           |       |            |                                         |
| 97       | 37.422           |          |         | 2782    | 506     |           |       |            |                                         |
| 98       | 37.422           |          |         | 1275    | 170     |           |       |            |                                         |
| 20       | 37.076           |          |         | 1431    | 192     |           |       |            |                                         |

Flags: A - Peak quantitates above calibration range a - Peak quantitates below reporting limit

H - User selected alternate compound hit

M - Peak manually integrated or manually identified R - Peak fails recovery

U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

| Target | Compounds |
|--------|-----------|
| rarget | Compounds |

| Peak   | Expected |                         |
|--------|----------|-------------------------|
| RT     | RT       | Target Compound         |
|        | ======   |                         |
| 5.391  | 5.391    | Tetrachloro-meta-xylene |
| 6.590  | 6.592    | BZ#8                    |
| 7.696  | 7.698    | BZ#18                   |
| 9.135  | 9.137    | BZ#28                   |
| 10.339 | 10,341   | BZ#52                   |
| 11.307 | :11.312  | BZ#44                   |
| 13.052 | 13.056   | BZ#66                   |
| 13.910 | 13.914   | BZ#101                  |
| 16.073 | 16.080   | .BZ#77                  |
| 17.071 | 17.075   | BZ#118                  |
| 17.988 | 17.995   | BZ#1530276              |

- Land Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the

STL Burlington - Target GC Injection Report

| Target Compound |    |
|-----------------|----|
|                 | == |
| BZ#105          |    |
| BZ#138          |    |
| BZ#126          |    |
| BZ#187          |    |
| BZ#128          |    |
| BZ#180          |    |
| BZ#198          |    |
| BZ#170          |    |
| BZ#195          |    |
| BZ#206          |    |
| BZ#209          |    |

## FORM 1 OTHER ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

O8LCSD

Lab Name: STL BURLINGTON Contract: 22000

Lab Code: STLVT Case No.: 22000 SAS No.: SDG No.: 89891

Matrix: (soil/water) SOIL

Lab Sample ID: O8LCSD

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: 030CT021608-R031

% Moisture: 0 decanted: (Y/N) N

Date Received: \_\_\_\_\_

Extraction: (SepF/Cont/Sonc) OTHER

Date Extracted: 09/26/02

Concentrated Extract Volume: 10(mL) Date Analyzed: 10/04/02

Injection Volume: 1.0(uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: \_\_\_ Sulfur Cleanup: (Y/N) Y

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG

| ,                |    | <del></del> |
|------------------|----|-------------|
| 34883-43-7-~BZ#8 | 32 | 1           |
| 37680-65-2BZ#18  | 32 | ļ ——— ;     |
| 7012-37-5BZ#28   |    | i           |
| 41464-39-5BZ#44  |    |             |
| 35693-99-3BZ#52  | 32 | l           |
|                  | 32 |             |
| 32598-10-0BZ#66  | 32 |             |
| 32598-13-3BZ#77  | 31 |             |
| 37680-73-2BZ#101 | 32 |             |
| 32598-14-4BZ#105 | 32 |             |
| 31508-00-6BZ#118 | 32 |             |
| 57465-28-8BZ#126 | 32 | P           |
| 38380-07-3BZ#128 | 33 |             |
| 35065-28-2BZ#138 |    | l l         |
| 35065-27-1BZ#153 | 32 |             |
| 35065-30-6BZ#170 | 32 | P           |
| •• • • •         | 32 | ii          |
| 35065~29-3BZ#180 | 31 |             |
| 52663-68-0BZ#187 | 33 | P           |
| 52663-78-2BZ#195 | 32 | ]           |
| 40186-72-9BZ#206 | 32 |             |
| 2051-24-3BZ#209  | 32 |             |
| * a =            |    |             |
|                  |    |             |

FORM I OTHER

| (1,137)<br>(1,137)<br>(1,390)    |                                                          |
|----------------------------------|----------------------------------------------------------|
| (1,390)<br>(1,880)               |                                                          |
| <b>3.</b> [4]                    |                                                          |
|                                  |                                                          |
| 5.937 <sup>647</sup><br>Pt-23807 |                                                          |
| (5,218)                          | Tetrochioro neta xylene (1,5                             |
| (5.573)                          | 3288 (5,750)                                             |
| 15.331)                          | BZ#18 (6,690)                                            |
| ₹7,047)<br>₹7,390)<br>₹3,448)    |                                                          |
| -                                |                                                          |
|                                  | BZ#52 (8,971) BZ#49 (9,108)                              |
| (10,128)                         | B2844 (9.6                                               |
| #8: 373}<br>#1: 1833             | * 1 Annual                                               |
| <del>2(1,7852</del> )            | BZ#66 (11.2                                              |
|                                  | BZW101 (12.192)                                          |
| 5(12,881)                        | B2#61_413,                                               |
| <del>\$(14.215)</del>            | BZ#77 (13.732)                                           |
| (14,548)                         | 2013 (A.4                                                |
| ≥(15,721)                        | 2001-015.<br>ENG-18:                                     |
|                                  |                                                          |
| 图7.95秒                           | BZ#126 (17.740)                                          |
|                                  | 524107 (10.7407)<br>524107 (10.7407)<br>524107 (10.7407) |
|                                  | 12413° (18:                                              |
| (513:676)                        | 378457 (49<br>278457 (20                                 |
| £(20,522)                        | - B28400 (20)                                            |
|                                  |                                                          |
|                                  | BZ#198 (22.541)                                          |
| (22, 2933)                       |                                                          |
|                                  | . 5284.99 433,                                           |
| <b>≤</b> (24,893)                | 328495-424                                               |
| <b>(25,667)</b>                  |                                                          |
|                                  |                                                          |
|                                  | 92490 <u>(-427</u> -                                     |
| (28.333)                         | 504006-4874                                              |
| <del>28</del> :333               |                                                          |
|                                  |                                                          |
| aras                             |                                                          |
| (31,144)                         | *                                                        |
| \(\frac{132.221}{433.485}\)      |                                                          |
| <del>[[3</del> 2:493}            |                                                          |
| (5≂(33,500)                      |                                                          |
| #31.938≀                         |                                                          |
| F34:262)                         |                                                          |
| F34:262)                         |                                                          |
| 134.983)                         |                                                          |
| F34:262)                         | s •                                                      |
| 154.983)                         | s •                                                      |
| <u>1</u> 34.983)                 | . •                                                      |

Reported Method Integrator Matrix Lab Sample Column Instrument Analyst ID: O8LCSD : /var/chem/3327\_1.i/100302\_1/03OCT021608.b/32CONG\_3327RTX5\_RAW.m : 17-Oct-2002 13:48 rrm : Falcon 3327\_1.i RTX-5 SOIL Sample Type :
Injection Date :
Dilution Factor :
Data File : Data File : 03oct021608-r031.d Compound Sublist: ENVNET Client Sample IJ: 1.00 04-OCT-2002 01:25 LCSD OSLCSD Lab Sample ID: O8LCSD Client Sample ID: O8LCSD

: SOIL Matrix Sample Type : LCSD

Analyst : wInstrument : 3327\_1.i Analyst Injection Date : 04-OCT-2002 01:25

Dilution Factor: 1.00

: RTX-5 Column Data File : 03oct021608-r031.d

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_1.i/100302\_1/03OCT021608.b/32CONG\_3327RTX5\_RAW.m Reported : 17-Oct-2002\_13:48\_rrm

| _          |          |                  |                |             |              | Pe             | eaks                      |       |                                        |
|------------|----------|------------------|----------------|-------------|--------------|----------------|---------------------------|-------|----------------------------------------|
| Pea)<br>No |          | Peak<br>RT       | Expected<br>RT | Delta<br>RT | Area         | Height         | Extract<br>Conc.<br>(ppb) | Flags | Peak Identification                    |
|            |          |                  | ======         |             | =======      | =======        | ========                  | ===== | ====================================== |
|            | 1        | 0.884            |                |             | 19035        | 8396           |                           |       |                                        |
|            | 2        | 0.944            |                |             | 78334        | 9583           |                           |       |                                        |
|            | 3<br>4   | 1.137            |                |             | 22005        | 3115           |                           |       |                                        |
|            | 5        | 1.390<br>1.880   |                |             | 4766<br>2089 | 996            |                           |       |                                        |
|            | 6        | 2.363            |                |             | 932          | 375<br>188     |                           |       |                                        |
|            | 7        | 2.580            |                |             | 652          | 177            |                           |       |                                        |
|            | 8        | 2.671            |                |             | 2257         | 568            |                           |       |                                        |
|            | 9        | 3.159            |                |             | 584          | 150            |                           | 0.00  |                                        |
| :          | 10       | 3.234            |                |             | 1694         | 502            |                           |       |                                        |
|            | 11       | 3.309            |                |             | 2038         | 484            |                           |       |                                        |
| :          | 12       | 3.544            |                |             | 1029         | 224            |                           |       |                                        |
| ;          | 13       | 3.764            |                |             | 7339         | 2442           |                           |       |                                        |
| :          | 14       | 3.939            |                |             | 474          | 132            |                           |       |                                        |
| :          | 15       | 4.298            |                |             | 605          | 129            |                           |       |                                        |
| :          | 16       | 4.389            |                |             | 3836         | 1389           |                           |       |                                        |
| :          | 17       | 4.686            |                |             | 1876         | 616            |                           |       |                                        |
| \$         | 18       | 4.992            | 5.001          | -0.009      | 332904       | 132348         | 41.9962                   |       | Tetrachloro-meta-xylene                |
| :          | 19       | 5.218            |                |             | 2308         | 379            |                           |       | •                                      |
| :          | 20       | 5 - 5.73         |                |             | 5013         | 1324           |                           |       |                                        |
| :          | 21       | 5.750            | 5.761          | -0.011      | 199450       | 66972          | 96.0701                   |       | BZ#8                                   |
| :          | 22       | 6.331            |                |             | 674          | 118            |                           |       |                                        |
| - 2        | 23       | 6.690            | 6.701          | -0.011      | 238101       | 75052          | 96.3492                   |       | BZ#18                                  |
| - 2        | 24       | 7.047            |                |             | 1011         | 158            |                           |       |                                        |
| :          | 25       | 7.390            |                |             | 1045         | 355            |                           |       |                                        |
| 2          | 26       | 7.648            |                |             | 432          | 154            | •                         |       |                                        |
| - 2        | 27       | 7.756            |                |             | 1084         | 324            |                           |       |                                        |
|            | 28       | 7.911            | 7.925          | -0.013      | 403434       | 125366         | 95.1817                   |       | BZ#28                                  |
|            | 29       | 8.971            | 8.984          | -0.013      | 311687       | 88747          | 96.6581                   |       | BZ#52                                  |
|            | 30       | 9.108            |                |             | 380458       | 102700         |                           |       |                                        |
|            | 31       | 9.654            | 9.667          | -0.013      | 416648       | 113076         | 96.6957                   |       | BZ#44                                  |
|            | 32       | 10.128           |                |             | 5946         | 1400           |                           |       |                                        |
|            | 33       | 10.370           |                |             | 325          | 95             |                           |       |                                        |
|            | 34       | 10.593           |                |             | 233          | 66             |                           |       |                                        |
|            | 35       | 10.804           |                |             | 442          | 121            |                           |       |                                        |
|            | 36<br>37 | 10.948           |                |             | 922          | 253            |                           |       |                                        |
|            |          |                  | 11 242         | 0.016       | 265          | 94             | 04 0040                   |       |                                        |
|            | 38<br>39 | 11.227<br>11.786 | 11.243         | -0.016      | 451034       | 108141         | 94.9248                   | М     | BZ#66                                  |
|            | 40       | 11.892           |                |             | 2857<br>6207 | 592            |                           |       |                                        |
|            | 41       | 12.192           | 12.207         | -0.016      | 428189       | 1294<br>100956 | 97.9142                   | м.    | P7#101                                 |
|            | 42       | 12.881           | 12.207         | -0.010      | 1861         | 422            | 37.3142                   | М     | BZ#101                                 |
|            | 43       | 13.302           |                |             | 911113       | 199937         |                           |       |                                        |
|            | 44       | 13.732           | 13.752         | -0.020      | 333365       | 57792          | 95.8952                   | M     | BZ#77                                  |
|            | 45       | 14.215           |                | 2.000       | 13396        | 1532           | 22.032                    | 4.7   | Δυπ , ,                                |
|            | 46       | 14.548           |                |             | 3263         | 548            |                           |       |                                        |
|            | 47       | 14.807           |                |             | 475984       | 111408         |                           |       |                                        |
|            | 48       | 14.920           | 14.938         | -0.018      | 529395       | 106128         | 96.9925                   | м     | BZ#118                                 |
|            | 49       | 15.410           |                |             | 663878       | 148595         |                           |       |                                        |
|            | 50       | 15.721           |                |             | 17974        | 3043           |                           |       |                                        |
|            | 51       | 15.978           | 15.993         | -0.016      | 987002       | 162836         | 195.484                   | MR    | BZ#153                                 |
|            | 52       | 16.137           | 16.155         | -0.018      | 664672       | 129763         | 95.3374                   |       | BZ#105                                 |
|            | 53       | 17.053           |                |             | 551          | 129            |                           |       |                                        |
| 9          | 54       | 17.135           |                |             | 1457         | 320            |                           |       |                                        |
| Š          | 55       | 17.310           | 17.328         | -0.018      | 615983       | -131334        | 280710                    | М     | BZ#138                                 |

|     |     |        |          |        |         |         | Extract |       |                     |
|-----|-----|--------|----------|--------|---------|---------|---------|-------|---------------------|
| Pea |     | Peak   | Expected | Delta  |         |         | Conc.   |       |                     |
| No  | ٥.  | RT     | RT       | RT     | Area    | Height  | (dqq)   | Flags | Peak Identification |
|     | === |        |          |        | ======= | ======= |         |       |                     |
|     | 56  | 17.740 | 17.762   | -0.022 | 387246  | 65203   | 96.7034 |       | BZ#126              |
|     | 57  | 18.154 | 18.170   | -0.016 | 567523  | 116497  | 98.2481 | М     | BZ#187              |
|     | 58  | 18.398 |          |        | 611611  | 128662  |         |       |                     |
|     | 59  | 18.631 | 18.647   | -0.016 | 667691  | 145748  | 98.2904 | M     | BZ#128              |
|     | 60  | 18.742 |          |        | 601064  | 111432  |         |       |                     |
|     | 61  | 19.436 |          |        | 3449    | 468     |         |       |                     |
|     | 62  | 19.571 |          |        | 3571    | 575     |         |       |                     |
|     | 63  | 19.866 |          |        | 646352  | 131358  |         |       |                     |
|     | 64  | 20.156 |          |        | 668753  | 130235  |         |       |                     |
|     | 65  | 20.522 |          |        | 12073   | 1869    |         |       |                     |
|     | 66  | 20.764 | 20.781   | -0.018 | 680546  | 135623  | 96.8041 |       | BZ#180              |
|     | 67  | 21.834 |          |        | 525911  | 85833   |         |       |                     |
|     | 68  | 22.255 | 22.271   | -0.016 | 725481  | 143169  | 97.1437 |       | BZ#170              |
| \$  | 69  | 22.541 | 22.559   | -0.018 | 339018  | 64792   | 43.4228 |       | BZ#198              |
|     | 70  | 22.993 |          |        | 13182   | 2046    |         |       |                     |
|     | 71  | 23.213 |          |        | 2204    | 285     |         |       |                     |
|     | 72  | 23.800 |          |        | 702411  | 129527  |         |       |                     |
|     | 73  | 24.534 | 24.552   | -0.018 | 775109  | 149696  | 96.9603 |       | BZ#195              |
|     | 74  | 24.893 |          |        | 9544    | 1528    |         |       |                     |
|     | 75  | 25.667 |          |        | 10275   | 2058    |         |       |                     |
|     | 76  | 27.637 | 27.655   | -0.018 | 772832  | 137419  | 97.4310 |       | BZ#206              |
|     | 77  | 28.333 |          |        | 1488    | 263     |         |       |                     |
|     | 78  | 28.515 |          |        | 267     | 60      |         |       |                     |
|     | 79  | 29.165 | 29.180   | -0.016 | 689512  | 149018  | 99.6092 | M     | BZ#209              |
|     | 80  | 30.812 |          |        | 396     | 102     |         |       |                     |
|     | 81  | 31.144 |          |        | 590     | 97      |         |       |                     |
|     | 82  | 32.221 |          |        | 3371    | 747     |         |       |                     |
|     | 83  | 32.445 |          |        | 2744    | 379     |         |       |                     |
|     | 84  | 32.569 |          |        | 2676    | 452     |         |       |                     |
|     | 85  | 32.789 |          |        | 6563    | 904     |         |       |                     |
|     | 86  | 32.975 |          |        | 8438    | 693     |         |       |                     |
|     | 87  | 33.500 |          |        | 12677   | 1891    |         |       |                     |
|     | 88  | 34.030 |          |        | 848     | 182     |         |       |                     |
|     | 89  | 34.228 |          |        | 2199    | 236     |         |       |                     |
|     | 90  | 34.365 |          |        | 1993    | 501     |         |       |                     |
|     | 91  | 34.983 |          |        | 618     | 123     |         |       |                     |

Flags: A - Peak quantitates above calibration range

- a Peak quantitates below reporting limit
  H User selected alternate compound hit
- M Peak manually integrated or manually identified
- R Peak fails recovery
- U User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

\_\_\_\_\_ Target Compounds

| Peak   | Expected |                         |
|--------|----------|-------------------------|
| RT     | RT       | Target Compound         |
|        | ======   |                         |
| 4.992  | 5.001    | Tetrachloro-meta-xylene |
| 5.750  | 5.761    | BZ#8                    |
| 6.690  | 6.701    | BZ#18                   |
| 7.911  | 7.925    | BZ#28                   |
| 8.971  | 8.984    | BZ#52                   |
| 9.654  | 9.667    | BZ#44                   |
| 11.227 | 11.243   | BZ#66                   |
| 12.192 | 12.207   | BZ#101                  |
| 13.732 | 13.752   | BZ#77                   |
| 14.920 | 14.938   | BZ#118                  |
| 15.978 | 15.993   | BZ#153                  |
| 16.137 | 16.155   | BZ#105                  |
| 17.310 | 174 328  | BZ#138                  |
| 17.740 | ,17.762  | BZ#126                  |
| 18.154 | 18.170   | BZ#187                  |
| 18.631 | 18.647   | BZ#128                  |
| 20.764 | 20.781   | ·BZ#180                 |
| 22.255 | 22.271   | BZ#170                  |
| 22.541 | 22.559   | BZ#198() 28]            |

the second states that the second second

# STL Burlington - Target GC Injection Report

| Peak   | Expected |                 |
|--------|----------|-----------------|
| RT     | RT       | Target Compound |
|        |          |                 |
| 24.534 | 24.552   | BZ#195          |
| 27.637 | 27.655   | BZ#206          |
| 29.165 | 29.180   | BZ#209          |

and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s

|                                                                | Y (x10^5)       |                                                                            |
|----------------------------------------------------------------|-----------------|----------------------------------------------------------------------------|
|                                                                | 0 1 1 1 1 1 1 1 | 1.6.                                                                       |
| 7(1,224)<br>(1,002)<br>7(1,618)<br>N-172,068)                  |                 |                                                                            |
| 1 (                                                            |                 |                                                                            |
| 4 2 364 3 3 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3                  |                 |                                                                            |
| a-<br>-<br>-<br>                                               | Tetrochtore     | nete sylene (5,390)                                                        |
| 6-76,016)<br>76,433)                                           |                 | Matrix Analyst Instrument Column Integrator Method Reported                |
| 7                                                              | BZ818 (7.683)   | Matrix Analyst Instrument Column Integrator Method Reported                |
| 0 - (18, 175)<br>- (18, 175)<br>- (18, 1556)<br>- (18, 789)    |                 | d tent                                                                     |
| 5(9.534)                                                       |                 | _BZ#52 (10,725)445)                                                        |
| H1,152)                                                        |                 | + <b>√</b> # # ₩ ₩ ₩                                                       |
| 15 - 122-1413<br>11-22-1413<br>11-22-1413                      |                 | SOIL SOIL 3327_2.i RTX-CLPII Falcon /var/chem/3 17-Oct-2002                |
| Ti2,977)                                                       |                 |                                                                            |
| 714,355)<br>1114,869)<br>1514,869)                             |                 | 7332                                                                       |
| *                                                              | BZ#77 (16,055)  | (15.441) (37<br>: 49                                                       |
| 5- (52)                                                        |                 | 33************************************                                     |
| \$\tilde{\pi}\$ = \$\frac{\frac{18}{272}}{272}\$               |                 | Sampl Injec Dilut Data Compo/100302                                        |
| (19,174)<br>(19,174)<br>(19,174)                               |                 | Sample Ty Injection Dilution Data File Compound 00302_1/0                  |
| # P                                                            |                 | Sample Type Injection Da Dilution Fac Data File Compound Sub 100302_1/030C |
| N- 1722-2843                                                   |                 |                                                                            |
| 2                                                              |                 | **************************************                                     |
| N                                                              | BZ#198 (24,656  | 6) (24,429) 8 E O L O L O                                                  |
| 725.210)<br>N. (25.826)                                        |                 | LCSD<br>04-OCT-200:<br>1.00<br>03oct02160<br>ENVNET<br>08.b/32CONG         |
| 3-                                                             |                 | 2160<br>CONG                                                               |
| N- (28.287)<br>√28.808)                                        |                 | 1 1 00 10 1                                                                |
| 129,468)<br>8-                                                 |                 | 01:2:<br>r031<br>327R                                                      |
| ين. 368)<br>پي                                                 |                 | 01:25<br>-r031.d<br>3327RTXCLPII                                           |
| 1231.481)<br>(231.765)<br>(232.164)                            |                 | IId                                                                        |
| (32.678)<br>(33.095)                                           | -               | RAW . m                                                                    |
| (34,609)                                                       |                 | ı. m                                                                       |
| र्भे के हैं : 524)<br>स्व = ================================== |                 | L                                                                          |
| 5(36,398)<br>4-<br>1(37,402)                                   | ∜ •             |                                                                            |
| w -                                                            |                 |                                                                            |
| 3-                                                             | 0283            |                                                                            |
| 8-                                                             | 0203            |                                                                            |

4-

Lab Sample ID: O8LCSD Client Sample ID: O8LCSD

Matrix : SOIL Sample Type : LCSD

Analyst : w Injection Date : 04-OCT-2002 01:25

Instrument : 3327\_2.i Dilution Factor : 1.00

Column : RTX-CLPII : 03oct021608-r031.d Data File

Integrator : Falcon Compound Sublist: ENVNET

Method : /var/chem/3327\_2.i/100302\_1/03OCT021608.b/32CONG\_3327RTXCLPII\_RAW.m Reported : 17-Oct-2002\_13:49\_rrm

: 17-Oct-2002 13:49 rrm

|          |                  | <del> </del> |        |                 | Pea            | aks                |       |                 |                                         |     |
|----------|------------------|--------------|--------|-----------------|----------------|--------------------|-------|-----------------|-----------------------------------------|-----|
| Peak     | Peak             | Expected     | Delta  |                 |                | Extract            |       |                 |                                         |     |
| No.      | RT               | RT           | RT     | Area            | Height         | Conc.<br>(ppb)     | Flags | De              | eak Identificat                         | ion |
| ====     | ======           |              | ====== |                 |                | =======            | ===== |                 | ==========                              |     |
| 1        | 1.002            |              |        | 122589          | 11229          |                    |       |                 |                                         |     |
| 2        | 1.224            |              |        | 24714           | 2915           |                    |       |                 |                                         |     |
| 3        | 1.618            |              |        | 4286            | 947            |                    |       |                 |                                         |     |
| 4        | 1.802            |              |        | 1652            | 225            |                    |       |                 |                                         |     |
| 5<br>6   | 2.068            |              |        | 1183            | 208            |                    |       |                 |                                         |     |
| 7        | 2.724<br>2.899   |              |        | 1026            | 243            |                    |       |                 |                                         |     |
| 8        | 3.114            |              |        | 902<br>782      | 138            |                    |       |                 |                                         |     |
| 9        | 3.221            |              |        | 2207            | 255<br>696     |                    |       |                 |                                         |     |
| 10       | 3.378            |              |        | 530             | 108            | *                  | 80    |                 |                                         |     |
| 11       | 3.496            |              |        | 1969            | 515            |                    |       |                 |                                         |     |
| 12       | 3.666            |              |        | 559             | 123            |                    |       |                 |                                         |     |
| 13       | 3.833            |              |        | 1877            | 384            |                    |       |                 |                                         |     |
| 14       | 3.941            |              |        | 2171            | 611            |                    |       |                 |                                         |     |
| 15       | 4.052            |              |        | 12099           | 3296           |                    |       |                 |                                         |     |
| 16       | 4.252            |              |        | 2455            | 361            |                    |       |                 |                                         |     |
| 17       | 4.413            |              |        | 1793            | 310            |                    |       |                 |                                         |     |
| 18       | 4.586            |              |        | 1571            | 315            |                    |       |                 |                                         |     |
| 19       | 4.688            |              |        | 5572            | 1699           |                    |       |                 |                                         |     |
| 20       | 5.380            | 5.391        | -0.011 | 454183          | 156441         | 41.5263            |       | Tetrachloro-    | meta-vvlene                             |     |
| 21       | 5.568            |              |        | 4514            | 927            |                    |       |                 | meta xyrene                             |     |
| 22       | 6.016            |              |        | 3504            | 960            |                    |       |                 |                                         |     |
| 23       | 6.247            |              |        | 3907            | 1331           |                    |       |                 |                                         |     |
| 24       | 6.433            |              |        | 1485            | 486            |                    |       |                 |                                         |     |
| 25       | 6.577            | 6.592        | -0.016 | 298327          | 83044          | 96.4094            |       | BZ#8            |                                         |     |
| 26       | 7.683            | 7.698        | -0.016 | 378342          | 95825          | 97.1640            |       | BZ#18           |                                         |     |
| 27       | 8.175            |              |        | 1325            | 195            |                    |       |                 |                                         |     |
| 28       | 8.397            |              |        | 355             | 84             |                    |       |                 |                                         |     |
| 29       | 8.556            |              |        | 1260            | 354            |                    |       |                 |                                         |     |
| 30       | 8.789            |              |        | 896             | 205            |                    |       |                 |                                         |     |
| 31       | 9.122            | 9.137        | -0.016 | 627696          | 163239         | 95.3372            |       | BZ#28           |                                         |     |
| 32       | 9.534            | 10 241       |        | 7852            | 1086           |                    |       |                 |                                         |     |
| 33<br>34 | 10.325           | 10.341       | -0.016 | 503231          | 118025         | 96.9344            |       | BZ#52           |                                         |     |
| 35       | 10.465<br>11.152 |              |        | 614525          | 134564         |                    |       |                 |                                         |     |
| 36       | 11.152           | 11.312       | -0.018 | 745             | 169            |                    |       | 1 - 197         |                                         |     |
| 37       | 11.538           | 11.312       | -0.018 | 668311<br>12097 | 150927<br>2082 | 96.8448            |       | BZ#44           |                                         |     |
| 38       | 12.141           |              |        | 351             |                |                    |       |                 |                                         |     |
| 39       | 12.327           |              |        | 397             | 103            |                    |       | 100             | 100000000000000000000000000000000000000 |     |
| 40       | 12.435           |              |        | 604             | 138            |                    |       |                 |                                         |     |
| 41       | 12.584           |              |        | 1332            | 312            |                    |       |                 |                                         |     |
| 42       | 12.877           |              |        | 905             | 212            |                    |       |                 |                                         |     |
| 43       | 13.038           | 13.056       | -0.018 | 740878          | 154013         | 94 9779            |       | Dallee          |                                         |     |
| 44       | 13.894           | 13.914       | -0.020 | 723611          | 143769         | 94.8779<br>97.1025 |       | BZ#66<br>BZ#101 |                                         |     |
| 45       | 14.355           |              | - /    | 3331            | 409            | 57.1025            |       | 224101          |                                         |     |
| 46       | 14.869           |              |        | 2178            | 472            |                    |       |                 |                                         |     |
| 47       | 15.200           |              |        | 347             | 100            |                    |       |                 |                                         |     |
| 48       | 15.401           |              |        | 1573002         | 250067         |                    |       |                 |                                         |     |
| 49       | 16.055           | 16.080       | -0.024 | ,523311         | 87123          | 94.1241            |       | BZ#77           |                                         |     |
| 50       | 16.652           |              |        | 7848            | 1103           |                    |       |                 |                                         |     |
| 51       | 16.926           |              |        | 797445          | 165665         |                    |       |                 |                                         |     |
| 52       | 17.055           | 17.075       | -0.020 | 880407          |                | 96.0168            |       | BZ#118          |                                         |     |
| 53       | 17.634           |              |        | 1051152         | 221631         | 15                 |       |                 |                                         |     |
| 54       | 17.782           |              |        | 958188          | 178759         |                    |       |                 |                                         |     |
| 55       | 17.975           | 17.995       | -0.020 | 882343          | ~182493 0 2    | N                  |       | BZ#153          |                                         |     |

# STL Burlington - Target GC Injection Report

|       |         | _        |        |         |        | Extract |        |        |          |            |  |
|-------|---------|----------|--------|---------|--------|---------|--------|--------|----------|------------|--|
| Peak  | Peak    | Expected | Delta  |         |        | Conc.   |        |        |          |            |  |
| No.   | RT      | RT       | RT     | Area    | Height | (ppb)   | Flags  |        |          | entificati |  |
|       | ======= | =======  |        | ======= |        |         |        |        | ======== |            |  |
| 56    | 18.272  |          |        | 9944    | 1603   | 05.006  |        |        |          |            |  |
| 57    | 18.700  | 18.720   | -0.020 | 981902  | 194640 | 95.2186 |        | BZ#105 |          |            |  |
| 58    | 19.174  |          | 112122 | 32361   | 4515   |         |        |        | 20       |            |  |
| 59    | 19.693  | 19.713   | -0.020 | 1039510 | 195733 | 97.2471 |        | BZ#138 |          |            |  |
| 60    | 19.985  |          | 9      | 4697    | 886    |         | _      |        |          |            |  |
| 61    | 20.203  | 20.225   | -0.022 | 1548680 | 180156 | 192.741 |        | BZ#126 |          |            |  |
| 61    | 20.203  | 20.225   | -0.022 | 1548680 | 180156 | 192.741 | MR     | BZ#187 |          |            |  |
| 62    | 20.466  |          |        | 1097213 | 198017 |         |        |        |          |            |  |
| 63    | 21.036  |          |        | 953405  | 171974 |         |        |        |          |            |  |
| 64    | 21.442  | 21.462   | -0.020 | 1166056 | 221843 | 98.4494 | M      | BZ#128 |          |            |  |
| 65    | 21.896  |          |        | 2184    | 360    |         |        |        |          |            |  |
| 66    | 22.023  |          |        | 2873    | 509    |         |        |        |          |            |  |
| 67    | 22.284  |          |        | 2061    | 391    |         |        |        |          |            |  |
| 68    | 22.442  |          |        | 1114525 | 206895 |         |        |        |          |            |  |
| 69    | 22.863  |          |        | 1096588 | 204414 |         |        |        |          |            |  |
| 70    | 23.093  | 23.115   | -0.022 | 1200045 | 213680 | 94.4835 | M      | BZ#180 |          |            |  |
| 71    | 24.439  |          |        | 867604  | 146103 |         |        |        |          |            |  |
| \$ 72 | 24.656  | 24.678   | -0.022 | 559824  | 101060 | 42.4402 |        | BZ#198 |          |            |  |
| 73    | 24.982  | 25.004   | -0.022 | 1246039 | 229146 | 97.7450 | M      | BZ#170 |          |            |  |
| 74    | 25.210  |          |        | 22687   | 2763   |         |        |        |          |            |  |
| 75    | 25.826  |          |        | 763     | 124    |         |        |        |          |            |  |
| 76    | 26.389  |          |        | 1236617 | 219266 |         |        |        |          |            |  |
| 77    | 27.181  | 27.203   | -0.022 | 1353225 | 236776 | 96.3374 |        | BZ#195 |          |            |  |
| 78    | 28.003  |          |        | 571     | 112    |         | 18 17  |        |          |            |  |
| 79    | 28.287  |          |        | 13054   | 2543   |         | 12 111 |        |          |            |  |
| 80    | 28.808  |          |        | 366     | 51     |         |        |        |          |            |  |
| 81    | 29.468  |          |        | 481     | 101    |         |        |        |          |            |  |
| 82    | 29.788  | 29.805   | -0.018 | 1323218 | 274900 | 96.8338 | M      | BZ#206 |          |            |  |
| 83    | 30.368  |          |        | 565     | 65     |         |        |        |          |            |  |
| 84    | 30.734  | 30.754   | -0.020 | 1192117 | 260704 | 97.7055 | M      | BZ#209 |          |            |  |
| 85    | 31.481  |          |        | 1612    | 194    |         |        |        |          |            |  |
| 86    | 31.765  |          |        | 1725    | 128    |         |        |        |          |            |  |
| 87    | 32.164  |          |        | 4568    | 406    |         |        |        |          |            |  |
| 88    | 32.878  |          |        | 26539   | 1671   |         |        |        |          |            |  |
| 89    | 33.095  |          |        | 8273    | 902    |         |        |        |          |            |  |
| 90    | 33.817  |          |        | 6896    | 751    |         |        |        |          |            |  |
| 91    | 34.609  |          |        | 18023   | 2007   |         |        |        |          |            |  |
| 92    | 35.327  |          |        | 2624    | 325    |         |        |        |          |            |  |
| 93    | 35.524  |          |        | 2892    | 531    |         |        |        |          |            |  |
| 94    | 35.819  |          |        | 932     | 167    |         |        |        |          |            |  |
| 95    | 36.398  |          |        | 2944    | 557    |         |        |        |          |            |  |
| 96    | 37.402  |          |        | 1321    | 186    |         |        |        |          |            |  |

Flags: A - Peak quantitates above calibration range

a - Peak quantitates below reporting limit

### Target Compounds

| Peak<br>RT | Expected<br>RT | Target Compound         |
|------------|----------------|-------------------------|
| K1         | K1             | rarget compound         |
|            |                |                         |
| 5.380      | 5.391          | Tetrachloro-meta-xylene |
| 6.577      | 6.592          | BZ#8                    |
| 7.683      | 7.698          | BZ#18                   |
| 9.122      | 9.137          | BZ#28                   |
| 10.325     | 10.341         | BZ#52                   |
| 11.294     | 11.312         | BZ#44                   |
| 13.038     | 134 056        | BZ#66                   |
| 13.894     | 13.914         | BZ#101                  |
| 16.055     | 16.080         | BZ#77                   |
| 17.055     | 17.075         | BZ#118                  |
| 17.975     | 17.995         | -BZ#153                 |
| 18.700     | 18.720         | _BZ#105 C C C C         |
| 19.693     | 19.713         | BZ#138U285              |

H - User selected alternate compound hit

 $<sup>\</sup>ensuremath{\mathrm{M}}$  - Peak manually integrated or manually identified

R - Peak fails recovery

U - User disabled peak ID: either peak quantitates below reporting limit or peak identification not confirmed on second column

# STL Burlington - Target GC Injection Report

| Peak<br>RT | Expected<br>RT | Warran O.                               |
|------------|----------------|-----------------------------------------|
| KI.        | K1             | Target Compound                         |
| =======    | =======        | ======================================= |
| 20.203     | 20.225         | BZ#126                                  |
| 20.203     | 20.225         | BZ#187                                  |
| 21.442     | 21.462         | BZ#128                                  |
| 23.093     | 23.115         | BZ#180                                  |
| 24.656     | 24.678         | BZ#198                                  |
| 24.982     | 25.004         | BZ#170                                  |
| 27.181     | 27.203         | BZ#195                                  |
| 29.788     | 29.805         | BZ#206                                  |
| 30.734     | 30.754         | BZ#209                                  |



Severn Trent Laboratories, Inc.

# SAMPLE PREPARATION

| STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID | SDG: 89891  DATE: 9/36/03 - 6/900  ETR: 89891  DATE: 9/36/03 - 6/900  SSANDY FOLOOG LCSD.  SOALUS FOLOOG LCSD.  SOALUS FOLOOG LS 3, 3 30.000  SOALUS FOLOOG LS 3, 3 30.000  SOALUS FOLOOG LS 3, 3 30.000  SOALUS FOLOOG LS 3, 3 30.000  SOALUS FOLOOG LS 3, 3 30.000  SOALUS FOLOOG LS 3, 3 30.000  SOALUS FOLOOG LS 3, 3 30.000  SOALUS FOLOOG LS 3, 3 30.000  SOALUS FOLOOG LS 3, 3 30.000  SOALUS FOLOOG LS 3, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.000  SOALUS FOLOOG LS 5, 3 30.0000  SOALUS FOLOOG LS 5, 3 30.0000  SOALUS FOLOOG LS 5, 3 30.0000  SOALUS FOLO |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  STLID  ST | STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID |
| STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID | STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID |
| STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID | STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID |
| STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID | The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s |
| STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED  STETED | DATE NO. S. S. S. S. S. S. S. S. S. S. S. S. S.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  ST | DATE: SDU   CS   CS   CS   CS   CS   CS   CS   C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Sample Weight (30 grams soil) into a beaker  Samples  MTX: 500ul of (2.0ppm) Congener Matrix (32cmpd) to MS/MD/LCS/LCSD.  Extract 18 hours w/ 400 mL 1:1  Acetone/Flexane  Transfer to K-D set-up                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | DATER SDA 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| CLIENT ID  Sample Weight (30 grams soil) into a beaker  60 gms. baked granular Na2SO4, mix, Transfer to a pre-cleaned thimble  Transfer to soxhlet extractor  Surr: 1.5ml of Congener Surr. (0.3 ppm) to all samples  MTX: 500ul of (2.0ppm) Congener Matrix (32cmpd) to MS/MD/LCS/LCSD.  Extract 18 hours w/ 400 mL 1:1  Acetone/Hexane  Transfer to K-D set-up                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | DATE: SSD SSD SSD SSD SSD SSD SSD SSD SSD SS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Sample Weight (30 grams soil) into a beaker  Company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the company of the compan | DATER SUBJECT TO THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE OF THE TOTAL STATE |
| CLIENT ID  CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF CONTROL OF  | DATE: SPG: 8989  IT TO BE SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERVED SERV |
| CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT ID  CSB CLIENT | DATE: SDG: SPAND STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STATE OF STAT |
| CCS CLIENT ID  Sample Weight (30 grams soil) into a beaker  60 gms. baked granular Na2SO4, mix, Transfer to a pre-cleaned thimble  Transfer to soxhlet extractor  Surr: 1.5ml of Congener Surr. (0.3 ppm) to all samples  MTX: 500ul of (2.0ppm) Congener Matrix (32cmpd) to MS/MD/LCS/LCSD.  Extract 18 hours w/ 400 mL 1:1  Acetone/Hexane  Transfer to K-D set-up                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | DATE: SDG: 8989   DATE: SGG 8989   DATE: SGG 8989   DATE: SGG 8989   DATE: SGG 8989   DATE: SGG 8989   DATE: SGG 8989   DATE: SGG 8989   DATE: SGG 8989   DATE: SGG 8989   DATE: SGG 8989   DATE: SGG 8989   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: SGG 8999   DATE: |
| SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SILID  SI | DATE: SDG: 8989    STEID   DATE: 88989   STEID   DATE: 88989   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SAPE   SA |
| STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  STEID  ST | DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,889  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89,899  DATE: SDG: 89 |
| STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID | STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID |
| STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID | STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  DATE: 4989  Algorithms and the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of the selection of |
| STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID | STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID |
| STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID | STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID |
| STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID | STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID |
| STL ID  CSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD CO  CCSD  | STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID  STL ID |
| STL ID  CLIENT ID  Sample Weight (30 grams soil) into a beaker  So gms. baked granular Na2SO4, mix, Transfer to a pre-cleaned thimble  Transfer to soxhlet extractor  Surr. 1.5ml of Congener Surr. (0.3 ppm) to all samples  MTX: 500ul of (2.0ppm) Congener Matrix (32cmpd) to MS/MD/LCS/LCSD.  Extract 18 hours w/ 400 mL 1:1  Acetone/Hexane  Transfer to K-D set-up                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | STL ID  SDG. 89891  DATE: 89891  DATE: 89891  DATE: 89891  DECSD required only if a MS/MD is not a beaker  CSD required only if a MS/MD is not a pre-cleaned thimble  Transfer to soxhlet extractor  Surr: 1.5ml of Congener Surr. (0.3 ppm) to all samples  MTX: 500ul of (2.0ppm) Congener Matrix (32cmpd) to MS/MD/LCS/LCSD.  Extract 18 hours w/ 400 mL 1:1  Acetone/Hexane  Transfer to K-D set-up  Hexane exchange w/ 60 mLs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| STL ID  CLIENT ID  Sample Weight (30 grams soil) into a beaker  Sample Weight (30 grams soil) into a beaker  60 gms. baked granular Na2SO4, mix, Transfer to a pre-cleaned thimble  Transfer to soxhlet extractor  Surr. 1.5ml of Congener Surr.(0.3 ppm) to all samples  MTX: 500ul of (2.0ppm) Congener Matrix (32cmpd) to MS/MD/LCS/LCSD.  Extract 18 hours w/ 400 mL 1:1  Acetone/Hexane  Transfer to K-D set-up                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | STL ID  SDG  SDG  SAPSA  FITR: 8989  CLIENT ID  CSD required only if a MS/MD is not a pre-cleaned thimble  Transfer to soxhlet extractor  Surr: 1.5ml of Congener Surr. (0.3 ppm) to all samples  MTX: 500ul of (2.0ppm) Congener Matrix (32cmpd) to MS/MD/LCS/LCSD.  Extract 18 hours w/ 400 mL 1:1  Acetone/Hexane  Transfer to K-D set-up  Hexane exchange w/ 60 mLs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| STL ID  Sample Weight (30 grams soil) into a beaker  60 gms. baked granular Na2SO4, mix, Transfer to a pre-cleaned thimble  Transfer to soxhlet extractor  Surr. 1.5ml of Congener Surr. (0.3 ppm) to all samples  MTX: 500ul of (2.0ppm) Congener Matrix (32cmpd) to MS/MD/LCS/LCSD.  Extract 18 hours w/ 400 mL 1:1  Acetone/Hexane  Transfer to K-D set-up                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | STL ID  SDG: 8989  CLIENT ID  CLIENT ID  CLIENT ID  Sample Weight (30 grams soil) into a beaker  60 gms. baked granular Na2SO4, mix, Transfer to a pre-cleaned thimble  Transfer to soxhlet extractor  Surr. 1.5ml of Congener Surr. (0.3 ppm) to all samples  MTX: 500ul of (2.0ppm) Congener Matrix (32cmpd) to MS/MD/LCS/LCSD.  Extract 18 hours w/ 400 mL 1:1  Acetone/Hexane  Transfer to K-D set-up  Hexane exchange w/ 60 mLs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | WITNESS: 5 # Sq8q]  *CSD required only if a MS/MD is not e                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 126/67 6-1900<br>16868<br>16868                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

# STL 8082 RUNLOG

HP3327 CH. 03 & CH. 04

Injection volume 2.0 ul

RTX-5 and RTX-CLP II (0.32mm ID)

DATE: 10/3/02 ANALYST: 22M PROJECT: 100102

TARGET DIRECTORY:\_\_\_\_ 100302-1 MULTICHROM INITIAL CALIBRATION FILENAME: 03 0CT 02/607

| 7                | 2       | 5       | 71        | 13                 | 12    | E       | 0      | a        | $\alpha$ | 7                          | 6       | u.     | 4      | γ       | 2      | _            | 10                                        | 2     | a         | 7           | ଟ           | S          | ٦             | W     | 2          | -            | ini<br>#                    |
|------------------|---------|---------|-----------|--------------------|-------|---------|--------|----------|----------|----------------------------|---------|--------|--------|---------|--------|--------------|-------------------------------------------|-------|-----------|-------------|-------------|------------|---------------|-------|------------|--------------|-----------------------------|
| 2021147          | 13      | 502 112 | PIBLE-    | 32-00Nb-13         | piach | 5021117 | 502110 | 502199.5 | 502100-  | 502107-                    | 502106. | 502/05 | 502104 | 081CSD- | 081CS- | PBUL OB      | 20ICU-50                                  | DIALL | 32(DN6-LS | 3260W6-L4   | 32 CONV6-C3 | 32 COM5-62 | 32 CONG-L1    | PIBLE | PIBLIL     | PIBLK        | Lab ID                      |
| xh               | S(N-    |         | SUN-      |                    |       |         |        | 4        |          |                            |         |        |        |         |        | 03007021603  | 1 H                                       |       |           |             |             | N          |               |       |            | 0300702 1607 | Analysis Filename/<br>Batch |
|                  |         | ·       | 1         |                    |       |         |        |          |          |                            | OC.     |        |        | , e     |        | 5            |                                           |       |           |             |             |            |               |       |            |              | Dilution<br>Factor          |
| Sewern Trees     |         |         |           |                    |       |         |        |          | ga IX    |                            | II E    |        |        |         |        | 89891        | R. P. P. P. P. P. P. P. P. P. P. P. P. P. |       |           |             |             |            |               |       |            |              | SDG                         |
|                  |         | 11      |           |                    |       |         |        |          |          |                            |         | 111    |        | ₽<br>II | F      | >            |                                           |       |           |             |             |            | To the second | ·     |            |              | Matrix                      |
| Jahoratones - VI |         | -       | =         |                    |       | 77      |        |          | 75       | - d                        |         |        | æ.     |         | , j    | 0926 05      |                                           |       |           |             |             |            |               |       |            |              | Prep Batch                  |
|                  | < = 1 L |         | fm .      | 7                  |       |         |        |          | ш,       |                            |         | 2      | - 1    |         |        | \$           |                                           | _     |           | -           |             | -          |               |       | - 110<br>= | -            | QC<br>check                 |
|                  |         |         | 77        | r                  | 9     | 2-      |        | ·        | 7 1      | = ,                        |         |        | ı      |         | -      | 3            | 4                                         |       |           |             |             | —.         | Pos           |       |            | -            | Int. By                     |
| Scy              | SC4     |         | OK-TEPLIT | OK OK [55 = 2500b] |       |         |        | 304      | •        | suffer present - sample ND |         |        |        |         |        | bu - 120 off | 11-20Ltg023                               |       | $\sim$    | 1 20 5 (de) | 60          | ا _0ند )   | 65072702-26   |       |            |              | Comments                    |

# STL 8082 RUNLOG

HP3327 CH. 03 & CH. 04

Injection volume 2.0 ul

RTX-5 and RTX-CLP II (0.32mm ID)

DATE: 10/3/02 ANALYST: 12/21 PROJECT: 100102

TARGET DIRECTORY: 100302 - 1 \_\_\_MULTICHROM INITIAL CALIBRATION FILENAME: 080C7021607

|                                |       |      | 26 %        | 223    | 3285                      | ji<br>#            |
|--------------------------------|-------|------|-------------|--------|---------------------------|--------------------|
|                                |       |      | 32-00.05-L3 | 202121 | מאמ                       |                    |
|                                |       |      |             |        | - Baich<br>- 030CT02 [608 | Analysis Filename/ |
|                                |       |      | -           | 4 3    | Factor                    | Dilution           |
| Severn Tu                      |       |      | ~           |        | 59841<br>SDG              | 3                  |
|                                |       |      | <b></b>     |        | Matrix                    |                    |
| Severn Tront Leboratories - VT |       |      |             |        | Prep Batch ONG OB         | 1                  |
|                                |       |      |             |        | check                     | ဂို                |
|                                |       |      | <b>3</b>    | +      | Int. By                   |                    |
| 9/a1/01 (m/J)                  | lost. |      | (m) 6W)     |        | Comments                  |                    |
| 7                              |       | 0290 |             | 7      |                           |                    |



Severn Trent Laboratories, Inc.

# SAMPLE HANDLING

|                                                                                                                                                                                                                                           |                                                                                                                                                                                 | 14 (34) (34)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | an s                                                                                                          |                     | 50 <b></b>                                                                                    |                                          |                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                          |                                       | _! |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|---------------------|-----------------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|----|
|                                                                                                                                                                                                                                           | 8353 3342 7221<br>L257 34EE                                                                                                                                                     | City Life Life Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP C State Life ZIP | To THOLD an Feed's section, print Feed's sections.  We cannot usely for FLD houses or FLD ZIP codes.  Address | Company SCU-Ju 1/7: | 3 To Recipients 1 14 6 1 2 14 4 4 5 Phone 80 2 655 12 0 5                                     | 2 Your Internal Billing Reference        | Address 5 C Dept. Proof Suite Plant                 | Company ( is ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord 1: ord | 25.33                                                                                                                                                                                                                                    | Fed X USA WithIll Folia 6.35333:27221 |    |
| By signing you nathoraze us to deliver this stripment without obtaining a signature and agree to undermary and hold us harmlass from any restlem grains.  Questions? Visit our Web site at fedex.com or call 1800 (s. Fedex. 80n 403 338) | 10m liability is limited to \$100 unless you dective a higher value. See back for dorals.  8 Release Signature Sum in ambrace delivery evidence delivery evidence of signature. | Total Pagkages Total Weight Total Declared Value* Total Charges.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | orbit Card No. below. 1                                                                                       | Purities Day Res    | CATURANY Leiknery  HOLD Weekday  HOLD Saturday  Annual or or or or or or or or or or or or or | FedEx Envelope FedEx Pak FedEx Pak Other | reight"   FedEx 2Day Freight   Second histories day | FedEx 2Day Second humins day FedEx finelogic ato not available. Meanum charge. Dive peend on the period period of the period period of the period on the period of the period on the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the period of the per | Packages up to 190 lbs.  Packages up to 190 lbs.  Dalway commons name has be in some areas.  Packages up to 190 lbs.  Dalway commons name has be in some areas.  New business morning  New business morning delivery to selectionations. | m. 0200 ·                             |    |

//25/or

| SEVE Lab Name: STL Burlington           | RN TRENT LAB          | ORATORIES LO      | G-IN SHEE      | T - Form D       | Page 1 of 1                                      |
|-----------------------------------------|-----------------------|-------------------|----------------|------------------|--------------------------------------------------|
| Received By (Print or Type Name         | e): Kyle W. Sink      | W                 |                |                  | Log-in Date: 09/25/02                            |
| Received By (Signature)                 | - Dink                |                   |                | ĕ                | Ü                                                |
| Case Number:                            | 22000                 | 2                 | CORRESPO       | ONDING           |                                                  |
| Sample Delivery Group No.:  ETR Number: | 89891<br>89891        | CLIENT<br>SAMPLE# | SAMPLE<br>TAG# | ASSIGNED<br>LAB# | REMARKS: CONDITION<br>OF SAMPLE SHIPMENT<br>ETC. |
| REMARKS:                                |                       | F01009 LS 1,3     | NA             | 502104           | Samples received intact with                     |
| 1. Custody Seal                         | Absent*               | F01009 LS 1,2     | NA             | 502105           | no custody seals present.                        |
| 2. Custody Seal Nos:                    | NA                    | F01009 LS 1,1     | NA             | 502106           | One cooler received at two                       |
| 3. Chain-of-Custody Records             | Present               | F01009 LS 2,3     | NA             | 502107           | degrees.                                         |
| 4. Sample Information Sheets            | Absent*               | F01009 LS 2,2     | NA             | 502108           |                                                  |
| 5. Airbill Present                      | As Airbill            | F01009 LS 2,1     | NA             | 502109           |                                                  |
| 6. Airbill Number(s):                   | 8353334 <b>6</b> 7221 | F01009 LS 3,3     | NA             | 502110           |                                                  |
| 7. Sample Tags                          | Absent*               | F01009 LS 3,2     | NA NA          | 502111           |                                                  |
| 8. Tag Nos. Listed on COC               | N/A                   | F01009 LS 3,1     | NA             | 502112           |                                                  |
| 9. Sample Condition:                    | Intact                | F01009 LS 4,3     | NA             | 502113           |                                                  |
| 10. VOA Vial Bubbles                    | N/A                   | F01009 LS 4,2     | NA             | 502114           |                                                  |
| 11. Does info on the custody            | -                     | F01009 LS 4,1     | NA             | 502115           |                                                  |
| records, sample info sheets,            | Yes                   | F01009 LS 5,3     | NA             | 502116           |                                                  |
| sample tags and labels agree?           | ,                     | F01009 LS 5,2     | NA             | 502117           |                                                  |
| 12. Date Received at Lab:               | 09/25/02              | F01009 LS 5,1     | NA             | 502118           |                                                  |
| 13. Time Received at Lab:               | 0930                  | F01009 LS 6,3     | NA             | 502119           |                                                  |
| 14. Cooler Temperature(s):              | 2 C                   | F01009 LS 6,2     | NA             | 502120           |                                                  |
| SAMPLE TRANSFER:                        | 11 22                 | F01009 LS 6,1     | NA             | 502121           |                                                  |
| Fraction(s):                            | ALL                   | J I               | X.             | Id               |                                                  |
| Area Number:                            | Level 4 Storage       |                   |                |                  |                                                  |
| Transferred By:                         | KSI                   |                   | ni (           | 1 1              | /                                                |
| Transferred On:                         | 09/25/02              |                   |                |                  |                                                  |
|                                         |                       |                   |                |                  |                                                  |
| !                                       |                       | A.E               |                |                  |                                                  |
|                                         |                       |                   | N.a.           |                  |                                                  |
|                                         | =                     |                   | 3034           |                  |                                                  |
| 2.0                                     | gh l'ag               |                   |                |                  |                                                  |
| L'a la                                  | 1 T                   |                   |                |                  | ,                                                |
|                                         |                       |                   | 7              |                  | WS 9/25/or                                       |
| _                                       | <u>*</u>              | ~~ 0203           |                |                  |                                                  |
| * Contact Project Director              | Reviewed By:          | <u> </u>          |                | Date:            |                                                  |

# \*\* COOLER RECEIPT CHECKLIST \*\*

| List ETR                              | (                               | 89891                       |             |                    |
|---------------------------------------|---------------------------------|-----------------------------|-------------|--------------------|
| WERE CUSTOD                           | Y SEALS PRES                    | SENT ON TI                  | HE COOLERS? | ) es               |
| YES<br>WERE THE CUS                   | NO ><br>TO <del>DY S</del> EALS | SIGNED?                     |             |                    |
| YES                                   | NO                              |                             |             |                    |
| WERE THERE C                          | USTODY SEA                      | L NUMBER                    | S?          |                    |
| YES LIST THE CUSTO                    | NO<br>DDY SEAL NU               | MBERS.                      |             |                    |
| WHAT TYPE OF                          | COOLING WA                      | AS UTILIZE                  | ED?         |                    |
| ICE                                   | MELTER                          | ICE                         | PACKS       | NONE               |
| COOLER TEMPE                          | RATURE (deg                     | rees c):                    | 2 (2        | 2-6 °C Acceptable) |
| DATE AND TIME                         | COOLER RE                       | CEIVED:                     | 09-25-02    | 0930               |
| DO SAMPLES AP                         | PEAR TO BE I                    | NTACT:                      | YES         | NO                 |
| DO ANY SAMPLE<br>(less than seven day |                                 | RT HOLDIN                   | NG TIMES?   |                    |
| WET (                                 | СНЕМ                            |                             | YES         | NO                 |
| EXTRA                                 | ACTABLES                        | ्रा <sup>8</sup><br>११<br>• | YES         | NO **              |
| UNPRI                                 | ES VOA                          |                             | YES         | NO                 |
| RADIATION SCR                         | EEN RESULTS                     | <b>&lt;0.05 MR/I</b>        | HR YES      | NO                 |

SM02 Cooler Rpt Chklist STL Burlington

C.3 Historical Assessment of the Lagoon from Aerial Photographs

## APPENDIX C.3

# HISTORICAL ASSESSMENT OF THE LAGOON FROM AERIAL PHOTOGRAPHS

A historical assessment of the lagoon environment was completed simultaneously with the historical assessment of the land area. A detailed description and visual analysis of the aerial photographs are included in Section 2.5 of the Ecosystem Restoration Report (ERR). The Commonwealth of the Northern Mariana Islands (CNMI) Division of Environmental Quality (DEQ) marine biology staff members were instrumental in the interpretation of changes in the lagoon environment apparent in the aerial photographs. The aerial photographs are included in Appendix C of the ERR.

## INTERPRETATION OF LAGOON ENVIRONMENT CHANGES

Upon review of the aerial photographs, it is apparent that the lagoon environment reacts to terrestrial changes on the adjacent shore. The nearshore *Enhalus* band is characteristically located in an area of freshwater infiltration and has remained fairly consistent throughout the past 70 years. The most significant changes have occurred in the mid-lagoon region, where *Halodule* and macroalgae are dominant. During periods when there was heavy development/land devoid of vegetation within the study area (1944, 1945, and 1999), abundant *Halodule* and macroalgae are apparent in the lagoon. During periods when development was suppressed due to minimal population and terrestrial vegetation was heavy, the lagoon appears to have more sandy-bottom areas and less macroalgae cover.

As discussed earlier, the 1945 image shows that Japanese development of the time was heavy. There are regions of exposed dirt/dredge material, many buildings, and numerous dirt "coral capped" roads throughout the region. This development and high population of the time were most likely associated with septic systems or other types of sewage disposal. Waste from these sources containing high levels of nutrients washing into the lagoon system affects the marine communities by supporting macroalgae and seagrass community growth (see Section 3.1.2.1 of the ERR). The 1945 photograph shows a band of what is most likely *Enhalus* seagrass closest to shore. This black band extends out to the deeper mid-lagoon region. The assumption is made that the *Enhalus* seagrass region, similar to all other photographs, extends only a couple hundred meters off-shore. The remaining portion of the black band in the 1945 image is probably Halodule seagrass or macroalgae stands. There is another bed of Halodule seagrass or macroalgae in the outer lagoon near the lighthouse. This is significant because the deeper midlagoon region is associated with stronger currents and tidal exchanges. These events would theoretically exchange high nutrient lagoon waters before they reach the outer lagoon. The large stand of seagrass or macroalgae present in the 1945 image suggests that nutrient rich groundwater may be affecting communities of the outer lagoon in the study area.

This high level of seagrass and macroalgae development is absent in later images from 1956, 1969, and 1976. All of these images show a band of *Enhalus* seagrass of varying width close to shore. None of the images show seagrass and macroalgae growth extending from shore to the mid-lagoon region. Furthermore, none of these images show any large development of seagrass or macroalgae in the outer lagoon. The majority of the lagoon as seen in the photographs shows

a barren sandy bottom, which requires lower levels of nutrients in runoff water, and groundwater, to maintain. Urban development and population levels had decreased during this time frame, with areas of former soil exposure replaced with vegetation growth, lessening nutrient transport to the lagoon.

The most recent (2009) image shows the most resemblance to the 1945 image in terms of seagrass and macroalgae stands associated with heavy urbanization and development within the watershed. Furthermore, it is only in the 1945 and 2009 image where there is a *Halodule* and macroalgae stand development in the outer lagoon, near the lighthouse. Thus the assumption can be made that increased development within the region during both the Japanese era and recent years have led the area susceptible to erosion and increased surface runoff, leading to an increase in contaminants, nutrients, and sediment washing into the lagoon, and ultimately altering the marine system.

C.4
Inshore Lagoon Seagrass and Associated Fauna Survey

## APPENDIX C.4

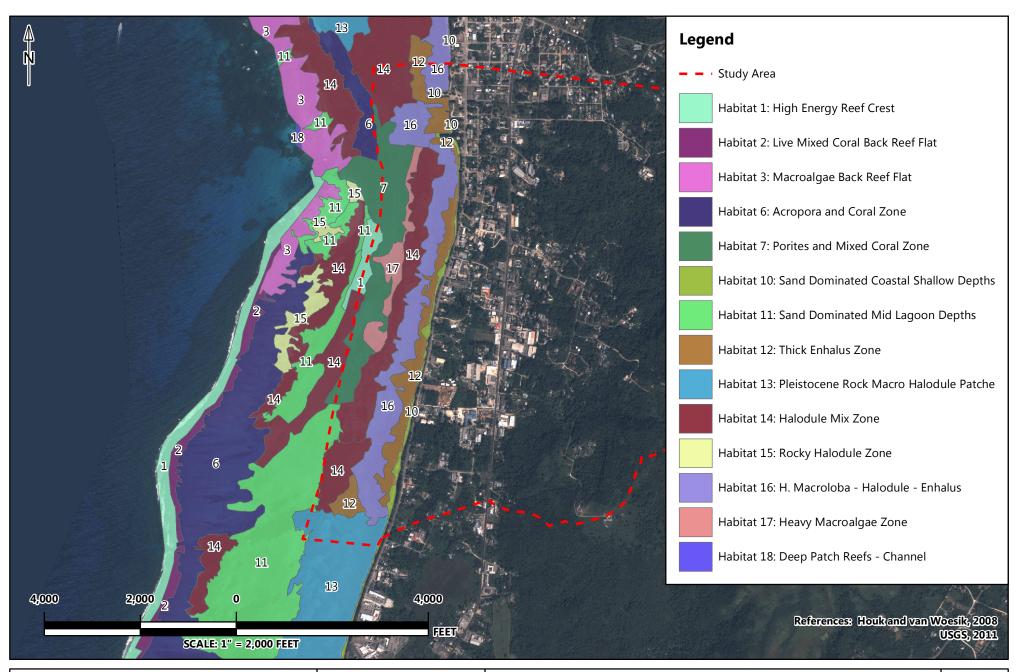
## INSHORE LAGOON SEAGRASS AND ASSOCIATED FAUNA SURVEY

The MMT Saipan Lagoon monitoring effort has completed an inventory of the lagoon, including the study area. Results of the initial assessment efforts in the study area indicate that the inner lagoon habitats are affected by increased nutrients associated with stormwater from the West Takpochau watershed reaching the drainages and shores in this region, and entering the lagoon. These habitats have high abundances of seasonal macroalgae growth when compared to outer lagoon habitats.

The MMT has designated 18 habitat classifications within the lagoon (Figure C.3). The focus of this study are the inshore habitats (Habitats 10, 12, 14, and 16) since they receive the majority of the fresh water pollution and serve as the first line of defense for the valuable coral reef and fisheries resources that lay further offshore.

- Habitat 1: Consists of a hard bottom with encrusting coralline algae and encrusting coral, along with turf algae. The typical depth of this habitat is approximately 0 to 2 feet.
- Habitat 2: Consists of a sandy bottom with a scattered abundance of live corals. The most common living benthic organism within this habitat is turf algae. The depth of this habitat is very shallow at approximately 1 to 3 feet.
- Habitat 3: Consists of a hard bottom with scattered sandy patches and seasonal macroalgae. The typical depth of this habitat is approximately 1 to 3 feet.
- Habitat 6: Consists of a sandy bottom with staghorn corals, *Acropora spp.*, in high abundances. Turf algae are also abundant. The typical depth of this habitat is approximately 5 to 7 feet. The framework resulting from accretion of the branching staghorn coral skeletons provides refuge for fish and other invertebrates. As a result, this habitat is heavily fished on a daily basis.
- Habitat 7: Consists of a sandy bottom with sparse living and dead corals. This habitat is in the deeper lagoon waters at approximately 10 to 12 feet. Dead corals generally have either turf algae or coralline algae growing on their surfaces.
- Habitat 10: Consists of a barren sand zone adjacent to shore. The common black sea cucumber, *Holothuria atra*, is abundant, and unattached seasonal macroalgae can be present dependant on local weather and oceanographic conditions. The typical depth of this habitat is approximately 1 to 2 feet.
- Habitat 11: Consists of a sandy bottom with the small seagrass, *Halodule uninervis*, and the very tiny seagrass, *Halophila minor*. This habitat is in the deeper lagoon waters at approximately 10 to 12 feet. Abundance of the common black sea cucumber, *Holothuria atra*, is highest in this habitat, possibly due to the predominantly sandy bottom.

- Habitat 12: Consists of the large seagrass, *Enhalus acoroides*. The typical depth of this habitat is approximately 2 to 4 feet. There are 81.8 (plus or minus  $[\pm]$  17.1) roots per 0.25 square meter  $(m^2)$  in this habitat.
- Habitat 13: Consists of a sandy bottom with the macroalgae, *Gelidiella acerosa* and turf algae. The average depth of this habitat is approximately 2 to 4 feet.
- Habitat 14: Consists of the small seagrass, *Halodule uninervis*, and the macroalgae, *Halimeda opuntia* commonly occurring along with other seasonal macroalgae. The typical depth of this habitat is approximately 3 to 5 feet.
- Habitat 15: Consists of a sandy bottom with abundant small seagrass, *Halodule uninervis*. The typical depth of this habitat is approximately 3 to 5 feet. Live and dead coral rocks are randomly located throughout this habitat, with less than 2 percent benthic coverage. This habitat is located adjacent to one or more barrier reef habitats.
- Habitat 16: Consists of a sandy bottom with the large seagrass, *Enhalus acoroides*, intermixed with the smaller seagrass, *Halodule uninervis*. There is also a large abundance of seasonal macroalgae in this habitat. The typical depth is approximately 3 to 5 feet.
- Habitat 17: This habitat is only located adjacent to the lighthouse channel and has not been found in any other Saipan Lagoon location. This habitat consists of a sandy bottom with a high abundance of seasonal macroalgae. The typical depth of this habitat is approximately 2 to 4 feet.
- Habitat 18: This is a habitat unique to the deeper areas of the lighthouse channel in the study area. The habitat is dominated by a sandy bottom with patch reefs at depths of approximately 12 to 20 ft.





| PROJECT NO.: 1057        | ECOSYSTEM RESTORATION REPORT                      |        |
|--------------------------|---------------------------------------------------|--------|
| DATE: SEPTEMBER 20, 2012 | SAIPAN LAGOON AQUATIC ECOSYSTEM RESTORATION STUDY | FIGURE |
| DRAWN BY: CB             | LAGOON HABITAT MAP                                | C.3    |
| REVIEWED BY: MA          | SAIPAN, CNMI                                      |        |

C.5
Inventory of Potentially Contaminating Activities in Watershed

## APPENDIX C.5

# INVENTORY OF POTENTIALLY CONTAMINATING ACTIVITIES IN WATERSHED

An integral part of this aquatic ecosystem restoration study was to identify land-based sources of pollution that could potentially contribute nutrients, sediments, or contaminants to the lagoon. Potentially contaminating activities (PCAs) within the study area were inventoried and subjected to a susceptibility analysis.

#### **METHODOLOGY**

Protocol for conducting the PCA inventory was based on guidelines included in the Source Water Assessment Program (SWAP) that was part of the Safe Drinking Water Act amendment in 1996. The objective of the SWAP program was to assess the susceptibility of all drinking water sources to activities that have significant potential to release contaminants to water sources. Although drinking water is not the primary focus of this study, the same principles were applied during the assessment of PCAs that affect the lagoon water. Therefore, for this study, a PCA is defined as a facility or activity that 1) stores, transmits, uses, or produces contaminants, chemicals or by-products; and 2) has the potential to release contaminants that may impact the quality of the lagoon water. The purpose of the inventory was to identify and locate all significant PCAs that are situated within the study area.

#### TECHNICAL APPROACH

The three basic steps of a PCA inventory are as follows:

- 1. **delineation** of the assessment area around the water source;
- 2. **inventory** of the assessment area to identify PCAs; and
- 3. **susceptibility** of the lagoon water to become contaminated from the identified PCAs.

#### **Delineation**

The purpose of delineating the assessment area is to determine the area around the lagoon that has a direct influence on the water quality of the lagoon. The area of concern for this study consists of the entire watershed within the study area, stretching from the shoreline to the west, the ridgeline to the east, Garapan Fishing dock to the north, and Quartermaster Road to the south.

## Inventory

Prior to conducting an inventory within the delineated assessment area, a list of PCAs was developed and each PCA was assigned to one of four categories: very high, high, medium and low potential to contaminate the lagoon. The PCA category list is presented in Table C.8.

PCAs were identified during a survey of the study area that was aided by a review of aerial photographs and maps of the study area. A field investigation was conducted to verify the existence, location, and nature of the PCAs identified during the data search described above.

# Susceptibility Analysis

Each individual PCA was categorized according to its class of contaminant. Four classes of contaminants were identified:

- 1. Sedimentation Any site or activity that could contribute unnaturally high sediment loads to the lagoon.
- 2. Hazardous Constituents Any site or activity that could contribute hazardous materials, chemicals, and/or waste to the lagoon.
- 3. Nutrient Sources Any site or activity that could contribute nutrient-laden materials to the lagoon.
- 4. Runoff Any site that is covered with a significant impervious surface (i.e. pavement) that produces unnaturally high freshwater runoff during storm events.

The health of the lagoon aquatic ecosystem is potentially adversely affected by all four of these contaminant types (hazardous, sediment, nutrient, and runoff). These contaminant classes are interrelated in that all are transported to the lagoon via stormwater runoff. Certain features within the watershed facilitate runoff (paved surfaces), certain activities contribute sediment and nutrients (de-vegetated land, agricultural land, malfunctioning sewage systems), and certain activities contribute hazardous contaminants (auto repair shops, surface spills, and light industrial facilities). Based on the high percentage of de-vegetated land area within the study area, contaminants such as nitrates, phosphates, and other nutrients found in soil and sediment are of the most concern because of their susceptibility to be transported to the lagoon via stormwater runoff. As discussed previously, elevated nutrient levels entering the lagoon have a deleterious effect on various components of the ecosystem and on the general function of the ecosystem as a whole.

#### GENERAL LAND USE ANALYSIS

The study area is characterized by a highly urbanized band located between Beach Road and Middle Road. Development in this area consists of garment factories, light industrial buildings, and residences. The Gualo Rai residential area lies upslope and inland of Middle Road. Many of the small side roads and lots are unpaved. There are storm drains along Middle Road and Beach Road, but there is no comprehensive collection and conveyance system designed to control stormwater within the developed areas in the Gualo Rai district and between Middle and Beach Roads. The storm drains that are present are poorly maintained and culverts are often clogged with sediment and debris.

De-vegetated, unpaved, and exposed soil surfaces, and impervious paved surfaces, coupled with the absence of a stormwater collection system leads to increased sediment loads entering the lagoon during storm events. During a storm event, roadways and paved lots serve as surface flow channels for rainwater runoff, enabling the transport of

# **Table C.8: PCA Category List**

The potential for contamination is based on the nature of the activities, contaminants associated with those activities, and past record of groundwater and/or surface water contamination regardless of whether any environmental standards were exceeded. The potential for contamination does not reflect toxicity of the contaminant and should not be utilized as a means of assessing risk. These rankings do not take into account any site-specific practices such as pollution prevention or protection measures such as BMPs. PCAs utilizing BMPs that may mitigate potential contamination will be acknowledged in the assessment summary.

|        | wledged in the assessment summary.       |                                                             |                                                         |                                                   |
|--------|------------------------------------------|-------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------|
| Very 1 |                                          | High                                                        | Medium                                                  | Low                                               |
| •      | RCRA & CERCLA sites                      | <ul> <li>Small Quantity Hazardous Waste</li> </ul>          | <ul> <li>Car washes</li> </ul>                          | <ul> <li>Office buildings/complexes</li> </ul>    |
| •      | Large Quantity Hazardous Waste           | Generators                                                  | <ul> <li>Parking lots/malls (&gt;50 spaces)</li> </ul>  | <ul> <li>Equipment rental yards</li> </ul>        |
|        | Generators                               | <ul> <li>Auto body shops</li> </ul>                         | <ul> <li>Cement/concrete plants</li> </ul>              | <ul> <li>Apartments and condominiums</li> </ul>   |
|        | RCRA TSD sites                           | <ul> <li>Automobile repair shops</li> </ul>                 | <ul> <li>Food processing*</li> </ul>                    | <ul> <li>Fire stations</li> </ul>                 |
| •      | Gas stations                             | <ul> <li>Boat services/repair/refinishing</li> </ul>        | <ul> <li>Funeral services/graveyards</li> </ul>         | <ul> <li>Schools (pre- up to</li> </ul>           |
|        | Chemical/petroleum processing/storage    | <ul> <li>Fleet/trucking/bus terminals</li> </ul>            | <ul> <li>Hardware/lumber/parts stores</li> </ul>        | intermediate/middle)                              |
|        | Chemical/petroleum pipeline              | <ul> <li>Furniture repair/manufacturing</li> </ul>          | <ul> <li>Residential parcels</li> </ul>                 | <ul> <li>Underground storage tanks</li> </ul>     |
| •      | Dry cleaners/processing                  | <ul> <li>Junk/scrap/salvage yards</li> </ul>                | <ul> <li>Sewer lines (H, in Zones A and B,</li> </ul>   | (decommissioned-inactive)                         |
| •      | Metal plating/finishing/fabricating      | <ul> <li>Machine shops</li> </ul>                           | otherwise M)*                                           | <ul><li>Roads/streets</li></ul>                   |
| •      | Plastics/synthetic fabricators           | <ul> <li>Photo processing/printing</li> </ul>               | <ul> <li>Motor pools</li> </ul>                         | <ul> <li>Veterinary offices/clinics</li> </ul>    |
| •      | Pesticides/herbicides mixing and         | <ul> <li>Research laboratories</li> </ul>                   | <ul><li>Parks</li></ul>                                 | <ul> <li>Medical/dental clinics</li> </ul>        |
|        | loading sites                            | <ul> <li>Sewer lines (H in Zones A and B, M in</li> </ul>   | <ul> <li>Waste transfer /recycling stations</li> </ul>  | <ul> <li>Storm drains (concrete lined)</li> </ul> |
| •      | Airports – maintenance fueling areas     | Zone C)*                                                    | <ul> <li>Sewage sludge (biosolids) land</li> </ul>      |                                                   |
| -      | Landfills/dumps/historic dumps           | <ul> <li>Utility stations/maintenance areas</li> </ul>      | applications*                                           |                                                   |
| •      | Cesspools – High density >1/acre (VH     | <ul> <li>Wastewater treatment plants (VH in</li> </ul>      | <ul> <li>Reclaimed wastewater irrigation (R1</li> </ul> |                                                   |
|        | in Zone A and B, M in Zone C)*           | Zones A and B, otherwise H)*                                | Water)*                                                 |                                                   |
| •      | Wastewater treatment plants (VH in       | <ul> <li>Confined animal feeding operations</li> </ul>      | <ul> <li>Above ground storage tanks</li> </ul>          |                                                   |
|        | Zone A and B, otherwise H)*              | (VH in Zones A and B, otherwise H)*                         | <ul> <li>Wells – improperly maintained</li> </ul>       |                                                   |
| •      | Underground injection of                 | <ul> <li>Pesticide distributors/professional</li> </ul>     | water supply, monitoring, and test                      |                                                   |
|        | commercial/industrial discharges         | applicators                                                 | holes                                                   |                                                   |
| •      | Injection wells/dry wells/sumps          | <ul> <li>Construction or farm machinery</li> </ul>          | <ul> <li>Contractor or government agency</li> </ul>     |                                                   |
| •      | Military installations                   | repair/maintenance                                          | equipment storage yards                                 |                                                   |
| •      | Leaking underground storage tanks        | <ul> <li>Septic systems (H in Zones A and B, M</li> </ul>   | <ul> <li>Transportation corridors (freeways,</li> </ul> |                                                   |
| •      | Confined animal feeding facilities (VH   | in Zone C)*                                                 | state highways, road right-of-ways)                     |                                                   |
|        | in Zone A, otherwise H) >25 head/acre    | Lagoons/liquid wastes*                                      | <ul> <li>Hospitals</li> </ul>                           |                                                   |
|        | beef cattle, dairy cattle, pigs, horses, | <ul> <li>Wells- geothermal (production and</li> </ul>       | <ul> <li>Storm drain discharge points</li> </ul>        |                                                   |
|        | others >200 fowl/acre*                   | injection)                                                  | <ul> <li>Stormwater detention facilities</li> </ul>     |                                                   |
| •      | Pineapple & sugarcane cultivation        | <ul> <li>Reclaimed water irrigation (R2 Water)*</li> </ul>  | <ul> <li>Stormwater drainage - dry wells</li> </ul>     |                                                   |
| •      | Feral animals including rats, pigs,      | <ul> <li>Grazing – surface water source*</li> </ul>         | <ul> <li>Artificial recharge projects (non-</li> </ul>  |                                                   |
|        | goats, and birds (surface water          | <ul> <li>Underground storage tanks (non-</li> </ul>         | potable water)                                          |                                                   |
|        | sources)*                                | regulated, not yet upgraded or                              | <ul> <li>Schools (high school and higher)</li> </ul>    |                                                   |
| •      | Improperly abandoned wells               | registered)                                                 | <ul> <li>Campgrounds</li> </ul>                         |                                                   |
| •      | Wood treatment facilities                | <ul> <li>Cultivated agricultural land (crops not</li> </ul> |                                                         |                                                   |
| •      | Power plants                             | using fumigants)                                            |                                                         |                                                   |
| •      | Illegal activities/unauthorized dumping  | ■ Golf courses                                              |                                                         |                                                   |
|        | Recorded spills                          | <ul> <li>Diversified agriculture (orchards,</li> </ul>      |                                                         |                                                   |
| •      | Other crops using soil fumigants         | silviculture)                                               |                                                         |                                                   |
|        | (direct application into soil)           |                                                             |                                                         |                                                   |

<sup>\*</sup>PCAs associated with microbial contamination.

sediment and surface contaminants to the lagoon. Large deposits of sediment create unnaturally large deltas in the lagoon, destroying the nearshore lagoon habitat. In addition, the sediment generally contains high levels of nutrients, such as nitrates and phosphates, which can have a deleterious effect on the lagoon water quality and ecosystem components in general. Stormwater runoff also transports surficial contaminants, such as spilled petroleum products from auto shops and parking lots, and microbiological contaminants from overflowing septic systems and sewer system leach fields, to the lagoon.

#### **DETAILED SITE INVENTORY**

Fifty four (54) sites were identified during the PCA inventory. A summary of the PCA inventory is provided in Table C.9 while detailed individual PCA information is presented in Table C.10. Figure C.4 depicts the location of each of the PCAs within the study area. The numbers presented in Table C.9 were used during the evaluation of the proposed detention basin sites (see Section 5.5of the ERR).

**Table C.9: PCA Summary** 

| Possible<br>Contaminant<br>Sources | Sedimentation | Hazardous | Nutrients | Runoff |
|------------------------------------|---------------|-----------|-----------|--------|
| Number of Sites                    | 6             | 32        | 2         | 26     |

Note: Some sites contained more than one possible contaminant source.

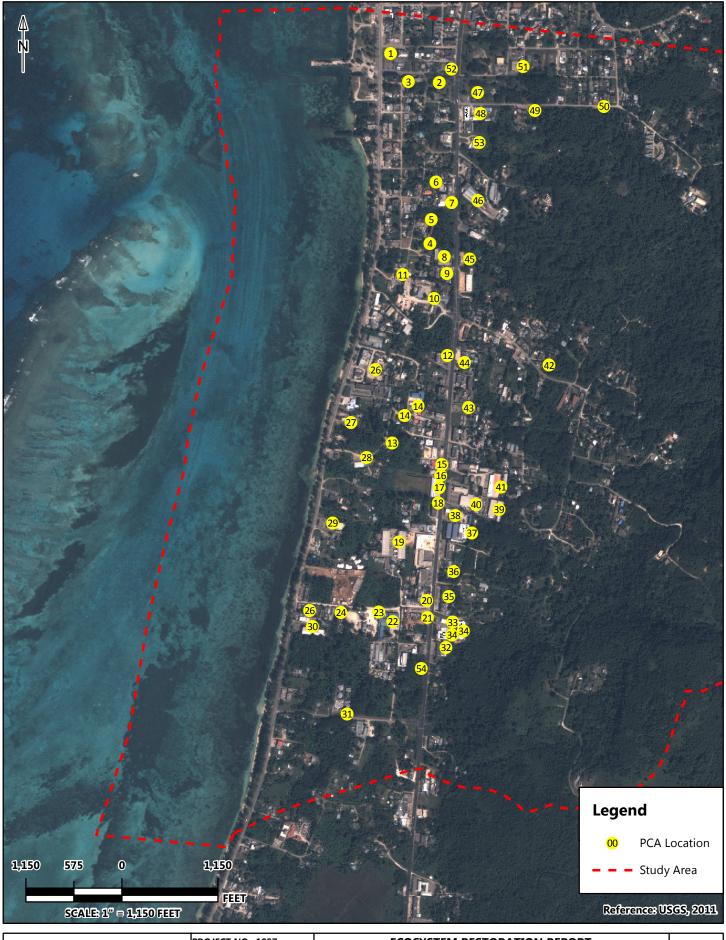
**Table C.10: Detailed PCA List** 

| PCA# | PCA Name                                            | PCA Description                                    | Contaminant Type<br>(Sed, Haz, Nut, Runoff) |
|------|-----------------------------------------------------|----------------------------------------------------|---------------------------------------------|
| 1    | Catholic Church Parking Lot                         | Parking lot with ~80 parking stalls                | Runoff                                      |
| 2    | Old Japanese Hospital Park                          | Park area                                          | Haz                                         |
| 3    | Hariguchi Bldg AST                                  | Back-up generator/AST~1,000 Gallon                 | Haz                                         |
| 4    | S2 Club Auto and Boat Repair Shop                   | Auto/boat repair facility                          | Haz                                         |
| 5    | Apartment Complex/Parking Lot                       | Unnamed apartment complex                          | Runoff/Haz                                  |
| 6    | Old Japanese Jail Park/Open Area                    | ~20,000 ft <sup>2</sup> park area/Archaeology site | Haz                                         |
| 7    | Mid-Pac Auto Parts and Rentals                      | Equipment rental and auto parts store              | Haz                                         |
| 8    | Luen Fung Enterprises                               | Wholesale distributor, meat/household Goods        | Haz                                         |
| 9    | Top Development Inc                                 | Auto repair/bus storage/air conditioning           | Haz                                         |
| 10   | Construction and Material Supply Inc                | Auto repair/construction storage                   | Haz                                         |
| 11   | Y.J.C. Automotive Repair Shop                       | Auto repair                                        | Haz                                         |
| 12   | J.E.Tenorio Building Complex                        | Parking lot and building complex                   | Runoff                                      |
| 13   | Pest X Exterminators                                | Pesticide storage                                  | Haz                                         |
| 14   | Chinese Christian Church-Saipan/Jehovah<br>Witness  | Parking lots and school building                   | Runoff                                      |
| 15   | Pacific Air conditioning and Refrigeration          | Air conditioning repair                            | Haz                                         |
| 16   | Shell Gasoline Station                              | Gas station with 3 pumps                           | Haz                                         |
| 17   | Golf Course                                         | Unpaved driving range                              | Runoff/ Sed                                 |
| 18   | Single Story Office Complex                         | Parking lot and building complex                   | Runoff                                      |
| 19   | Former Garment Factory/Warehouse Units              | Former factory and large paved surface             | Runoff/Haz                                  |
| 20   | XO Market-Adjacent Complex Unpaved Parking<br>Lot   | Large unpaved parking lot surface                  | Runoff/ Sed                                 |
| 21   | Marianas Repairs Company                            | Equipment rental and repair                        | Haz                                         |
| 22   | Former Garment Factory/Housing Units                | Large former garment factory with housing units    | Haz                                         |
| 23   | Brick Making Facility                               | Unconsolidated piles of sediment                   | Sed                                         |
| 24   | Motion Automotive Repair                            | Numerous vehicles, repair area, unpaved lot        | Haz/Sed                                     |
| 25   | JJJ Motors                                          | Car lot/repair facility/batteries and oil storage  | Haz                                         |
| 26   | USP Club Unpaved Parking Lot                        | Large unpaved parking lot at USP Club              | Sed                                         |
| 27   | Wendys Parking Lot                                  | Large paved parking lot                            | Runoff                                      |
| 28   | Taotao Marine Sports                                | Boat storage and repair facility, unpaved lot      | Haz/Runoff/Sed                              |
| 29   | National Office Supply                              | Large paved parking lot, building footprint        | Runoff                                      |
| 30   | Closed Retail and Warehouse Facility                | Large paved parking lot                            | Runoff                                      |
| 31   | Seventh Day Adventist Dental and Eye Care<br>Center | Large paved parking lot                            | Runoff                                      |
| 32   | Transamerica Corporation Construction Supply        | Hardware store and paved parking lot               | Haz/Runoff                                  |
| 33   | East West Center Rental                             | Rental store for heavy equipment                   | Haz                                         |
| 34   | Pearl River Wholesale                               | Large warehouse facility/large paved areas         | Runoff                                      |
| 35   | H-Mart                                              | Large paved parking lot/commercial center          | Runoff                                      |
| 36   | Aims Plus Auto Repair Facility                      | Auto repair facility                               | Haz                                         |
| 37   | Former Garment Factory                              | Large former garment factory with dormitories      | Haz/Runoff                                  |
| 38   | Shell Gasoline Station                              | Gas Station with 4 pumps                           | Haz                                         |
| 39   | Ace Hardware                                        | Hardware store and paved parking lot               | Haz/Runoff                                  |

| PCA# | PCA Name                                              | PCA Description                               | Contaminant Type<br>(Sed, Haz, Nut, Runoff) |
|------|-------------------------------------------------------|-----------------------------------------------|---------------------------------------------|
| 40   | Gualo Rai Commercial Center-Pizza Hut and<br>Napa     | Commercial center with paved parking lot      | Runoff                                      |
| 41   | Former Garment Factory                                | Large former garment factory with dormitories | Runoff                                      |
| 42   | Pacific Printing Press Inc.                           | Printing press facility                       | Haz                                         |
| 43   | Transpac Business Center                              | Large paved parking lot                       | Runoff                                      |
| 44   | Sewage Lift Station CUC-GR-1                          | Lift Station with 50 gallon diesel fuel tank  | Nut/Haz                                     |
| 45   | Pacific Medical Center                                | Large paved parking lot                       | Runoff                                      |
| 46   | Former Garment Factory                                | Large former garment factory with dormitories | Haz                                         |
| 47   | Sugar King Park                                       | Large grass area                              | Haz                                         |
| 48   | Taro Sue Corp Car Air Condition Shop                  | Air condition repair                          | Haz                                         |
| 49   | Carr-Haus                                             | Auto repair facility                          | Haz                                         |
| 50   | Road Master Auto Shop                                 | Auto repair facility                          | Haz                                         |
| 51   | Dept of Community & Cultural Affairs: Office on Aging | Large paved parking lot                       | Runoff                                      |
| 52   | Strip Mall                                            | Large paved parking lot                       | Runoff                                      |
| 53   | Cockfight Arena                                       | Large unpaved/grass area                      | Runoff/Nut                                  |
| 54   | Parking Lot                                           | Large paved parking lot                       | Runoff                                      |

Notes:

Haz=Hazardous Nut=Nutrients Sed=Sedimentation



| F             | PROJECT NO.: 1057        | ECOSYSTEM RESTORATION REPORT                      |        |
|---------------|--------------------------|---------------------------------------------------|--------|
| Environet Inc | DATE: SEPTEMBER 20, 2012 | SAIPAN LAGOON AQUATIC ECOSYSTEM RESTORATION STUDY | FIGURE |
|               | DRAWN BY: CB             | PCA LOCATIONS WITHIN STUDY AREA                   | C.4    |
|               | REVIEWED BY: MA          | SAIPAN, CNMI                                      |        |

C.6 Groundwater Investigation

## **APPENDIX C.6**

## **GROUNDWATER INVESTIGATION**

Nearshore groundwater samples were collected along the entire length of the study area and beyond in March, June, and August, 2002, in an effort to determine the impact of on-shore surface contaminants on the lagoon via groundwater infiltration. Samples were collected at low tide by manually digging holes on the shoreline and collecting the groundwater infiltrating to the shoreline. Four rounds of samples were collected and field analyzed for nitrate/nitrite and phosphate as well as water quality parameters. Nitrate concentrations in groundwater infiltrating at the shoreline ranged from 0 to 2.61 milligrams per liter (mg/L) (Table C.11). The Commonwealth of the Northern Mariana Islands (CNMI) water quality standard for nitrates in Class AA marine waters is less than (<) 0.20 mg/L (DEQ, 2010). Although this standard does not apply to groundwater, it is useful to apply to the nearshore groundwater samples due to their adjacent proximity to lagoon waters.

**Table C.11: Nearshore Groundwater Nitrate Results (Field Test)** 

| Sample<br>ID | March 12,<br>2002<br>Nitrate<br>(mg/L) | June 26,<br>2002<br>Nitrate<br>(mg/L) | June 30,<br>2002<br>Nitrate<br>(mg/L) | August 9,<br>2002<br>Nitrate<br>(mg/L) |
|--------------|----------------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|
| GWI-26       | 0                                      | 0                                     | 0                                     | 0.1                                    |
| GWI-25       |                                        |                                       | 0.08                                  | 0.3                                    |
| GWI-24       | 0                                      | 0                                     | 0.04                                  | 0.05                                   |
| GWI-12       |                                        |                                       | 1.4                                   | 1.6                                    |
| GWI-13       |                                        |                                       | 0.45                                  | 0.4                                    |
| GWI-14       | 2.21                                   | 1.73                                  | 1.5                                   | 1.4                                    |
| GWI-32       |                                        |                                       |                                       | 1                                      |
| GWI-27       |                                        |                                       |                                       | 0                                      |
| GWI-31       |                                        |                                       |                                       | 0.8                                    |
| GWI-15       |                                        |                                       | 0.6                                   | 0.15                                   |
| GWI-29       | 1.5                                    | 0.46                                  |                                       | 0.9                                    |
| GWI-28       | 0.51                                   |                                       |                                       | 0.2                                    |
| GWI-30       |                                        |                                       |                                       | 0.6                                    |
| GWI-16       |                                        |                                       |                                       | 0.7                                    |
| GWI-17       | 2.61                                   | 0.78                                  | 1                                     | 1.2                                    |
| GWI-18       |                                        |                                       |                                       | NA                                     |
| GWI-19       | 1.51                                   | 0.72                                  | 0                                     | 1.2                                    |
| GWI-20       |                                        |                                       |                                       | 0.2                                    |
| GWI-21       | 0                                      | 0.72                                  | 0.02                                  | 0.2                                    |
| GWI-22       |                                        |                                       |                                       | 0.6                                    |
| GWI-23       | 0                                      | 0                                     | 1 16 0                                | 0.8                                    |

Bold values exceed the CNMI water quality standard for Class AA Marine Waters.

The 2002 analytical results indicate that there are elevated nitrate levels in nearshore groundwater infiltrating to the lagoon. Nitrate levels of nearshore coastal marine waters may be affected by activities within the watershed.

Although semi-annual groundwater monitoring, including monitoring for nitrate indicators, has been required by the CNMI Division of Environmental Quality (DEQ) for many years, more recent groundwater data collected within the study area are not available due to the lack of a comprehensive groundwater management plan that includes methods for analyzing the collected samples and actions to be taken based on the data collected (DEQ, 2010).

## **REFERENCES**

DEQ, 2010. Commonwealth of the Northern Mariana Islands Integrated 305(b) and 303 (d) Water Quality Assessment Report. November.

C.7 Hydrologic Study of Runoff Processes in Watershed

## APPENDIX C.7

# HYDROLOGIC STUDY OF RUNOFF PROCESSES IN WATERSHED

## C.7.1 RAINFALL AND RUNOFF DATA COLLECTION

In order to acquire quantitative rainfall and runoff data, monitoring instruments were installed at several locations throughout the study area. Three tipping bucket rain gauges were installed on building rooftops, one on the Harabuchi Federal Building roof top at the northern end of the study area, one on the Pizza Hut Building roof top on Middle Road, and one on the Geotesting Building roof top at the southern end of the study area. These tipping bucket rain gauges recorded every 0.01 inch of rainfall on an automated recorder. Data was downloaded periodically during 2002.

Two pressure transducers were installed, one in a storm drain beneath Middle Road at the Quartermaster Road intersection and another in a storm drain beneath Middle Road, across from the Subway sandwich shop. These transducers measured and recorded the pressure and temperature of stormwater surface flow during rain events. For redundancy's sake, several stormwater events were measured manually throughout the year to augment the data collected by the transducers and rain gauges.

Data collected from the rain gauges, transducers, and by manual measurements was compiled in order to help determine general comprehensive hydrologic processes within the study area. Due to the logistical difficulties involved with collecting field data, the number of readings is limited. In an effort to compare data from the three monitoring efforts (rain gauges, transducers, and manual measurements), data from seven discrete rain events is compiled in Table C.12 through Table C.18.

Manual measurements of stormwater runoff were recorded most consistently from the intersection of Middle Road and Quartermaster Road. Based on average flow rates and duration of measurement intervals, discharge amounts were calculated ranging from 150 gallons over 12 minutes (on February 13, 2002) to 69,696 gallons over four hours and two minutes (September 20, 2002).

During the August 12, 2002 rain event, peak flow rates were measured at nine drains along Beach Road. Peak flow rates ranged from 12 gallons per minute (gpm) at Drain 13 to 1000 gpm at Drain 6. Table C.19 presents estimated stormwater runoff flow to the lagoon during this rain event.

Table C.12: Rain Event 1 (February 13, 2002)

| Me                                 | onitor Location    | Date      | Time        | Duration<br>(minutes) | Rainfall<br>Volume<br>(inches) | Average<br>Pressure<br>(psi) | Peak<br>Pressure<br>(psi) | Average<br>Runoff Water<br>Temperature<br>(°C) | Average<br>Flow<br>(gpm) | Peak<br>Flow<br>(gpm) |
|------------------------------------|--------------------|-----------|-------------|-----------------------|--------------------------------|------------------------------|---------------------------|------------------------------------------------|--------------------------|-----------------------|
| Rainguage<br>Data                  | Harabuchi Building | 2/13/2002 | 4:15-4:43   | 28                    | 0.14                           | -                            | -                         | -                                              | -                        | -                     |
| Raing<br>Da                        | Pizza Hut Building | 2/13/2002 | 11:07-11:11 | 4                     | 0.02                           | -                            | -                         | -                                              | -                        | -                     |
| ducer                              | Subway Site        | 2/13/2002 | -           | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Transducer<br>Data                 | Quartermaster Site | 2/13/2002 | -           | -                     | -                              | 3.1                          | -                         | 29.78                                          | -                        | -                     |
| ts.                                | Commonwealth       | -         | -           | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Road                               | Pizza Hut          | -         | -           | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Middle Road<br>Manual Measurements | Subway             | -         | -           | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
|                                    | Quartermaster      | 2/13/2002 | 11:13-11:36 | 23                    | -                              | -                            | -                         | -                                              | 15                       | 27                    |

<sup>°</sup>C = degrees Celsius

Table C.13: Rain Event 2 (February 13, 2002)

| Мо                                  | nitor Location         | Date      | Time        | Duration<br>(minutes) | Rainfall<br>Volume<br>(inches) | Average<br>Pressure<br>(psi) | Peak<br>Pressure<br>(psi) | Average<br>Runoff Water<br>Temperature<br>(°C) | Average<br>Flow<br>(gpm) | Peak<br>Flow<br>(gpm) |
|-------------------------------------|------------------------|-----------|-------------|-----------------------|--------------------------------|------------------------------|---------------------------|------------------------------------------------|--------------------------|-----------------------|
| ge                                  | Harabuchi Building     | 2/13/2002 | 18:53-20:32 | 39                    | 0.18                           | -                            | -                         | -                                              | -                        | -                     |
| Rainguage<br>Data                   | Pizza Hut Building     | 2/13/2002 | 18:48-20:23 | 35                    | 0.1                            | -                            | -                         | -                                              | -                        | -                     |
| Rain<br>L                           | Geotesting<br>Building | -         | -           | -                     | -                              | -                            | -                         | -                                              | -                        |                       |
| Transducer<br>Data                  | Subway Site            | -         | -           | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Trans<br>Da                         | Quartermaster Site     | 2/13/2002 | -           | -                     | -                              | 3.07                         | -                         | 28.62                                          | -                        | -                     |
| Middle Rd<br>Manual<br>Measurements | Commonwealth           | -         | -           | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Middle Rd<br>Manual<br>easuremen    | Pizza Hut              | -         | -           | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Mid<br>M<br>east                    | Subway                 | -         | -           | -                     | ī                              | -                            | -                         | -                                              | -                        | -                     |
| M                                   | Quartermaster          | 2/13/2002 | 20:34-20:46 | 12                    | =                              | -                            | -                         | -                                              | 12.5                     | 19                    |
|                                     | Drain 2                | -         | -           | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| 70                                  | Drain 3                | -         | -           | -                     | -                              | _                            | -                         | -                                              | -                        | -                     |
| ents                                | Drain 4                | -         | -           | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| ad                                  | Drain 5                | -         | -           | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Roasu                               | Drain 6                | 2/13/2002 | 20:25       | one reading           | -                              | -                            | -                         | -                                              | -                        | 3                     |
| Beach Road<br>ial Measurer          | Drain 7                | -         | -           | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Beach Road<br>Manual Measurements   | Drain 11               | 2/13/2002 | 20:15       | one reading           | -                              | -                            | -                         | -                                              | -                        | 30                    |
| Mar                                 | Drain 12               | -         | -           | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
|                                     | Drain 13               | -         | -           | -                     | =                              | -                            | -                         | -                                              | -                        | -                     |
|                                     | Drain 14               | 2/13/2002 | 20:30       | one reading           | =                              | -                            | -                         | -                                              | -                        | 30                    |

**Table C.14: Rain Event 3 (May 8-9, 2002)** 

| Мо                                  | nitor Location         | Date                  | Time                      | Duration<br>(minutes) | Rainfall<br>Volume<br>(inches) | Average<br>Pressure<br>(psi) | Peak<br>Pressure<br>(psi) | Average<br>Runoff Water<br>Temperature<br>(°C) | Average<br>Flow<br>(gpm) | Peak<br>Flow<br>(gpm) |
|-------------------------------------|------------------------|-----------------------|---------------------------|-----------------------|--------------------------------|------------------------------|---------------------------|------------------------------------------------|--------------------------|-----------------------|
| Data                                | Harabuchi Building     | 5/8/2002-<br>5/9/2002 | 9:43 (5/8)-<br>5:25 (5/9) | 1182                  | 0.49                           | -                            | -                         | -                                              | -                        | -                     |
| Rainguage Data                      | Pizza Hut Building     | 5/8/2002-<br>5/9/2002 | 00:15-11:55               | 660                   | 0.86                           | -                            | -                         | -                                              | -                        | -                     |
| Rain                                | Geotesting<br>Building | -                     | -                         | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| ducer<br>ta                         | Subway Site            | -                     | -                         | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Transducer<br>Data                  | Quartermaster Site     | 5/8/2002-<br>5/9/2002 | -                         | -                     | -                              | 2.82                         | -                         | 26.74                                          | -                        | -                     |
| l<br>nts                            | Commonwealth           | -                     | -                         | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| e Rd<br>ual                         | Pizza Hut              | -                     | -                         | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Middle Rd<br>Manual<br>Measurements | Subway                 | 5/9/2002              | 7:18-7:30                 | 12                    | -                              | -                            | -                         | -                                              | 200                      | 300                   |
| Me                                  | Quartermaster          | 5/9/2002              | 6:20-7:00                 | 40                    | -                              | -                            | -                         | -                                              | 50                       | 140                   |
|                                     | Drain 2                | -                     | -                         | -                     | =                              | -                            | -                         | -                                              | -                        | =                     |
| ਕ                                   | Drain 3                | -                     | -                         | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| in the test                         | Drain 4                | -                     | -                         | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Ma                                  | Drain 5                | -                     | -                         | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Beach Road Manual<br>Measurments    | Drain 6                | 5/9/2002              | 6:10                      | one reading           | -                              | -                            | -                         | -                                              | -                        | 1200-<br>1500         |
| ch I                                | Drain 7                | -                     | -                         | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Seac                                | Drain 11               | 5/9/2002              | 6:17                      | one reading           | -                              | -                            | -                         | -                                              | -                        | 200                   |
| <u> </u>                            | Drain 12               | -                     | -                         | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
|                                     | Drain 13               | 5/9/2002              | 6:21                      | one reading           |                                | -                            | -                         | -                                              | -                        | 10                    |

**Table C.15: Rain Event 4 (July 1, 2002)** 

| Мо                                    | nitor Location         | Date     | Time | Duration<br>(minutes) | Rainfall<br>Volume<br>(inches) | Average<br>Pressure<br>(psi) | Peak<br>Pressure<br>(psi) | Average<br>Runoff Water<br>Temperature<br>(°C) | Average<br>Flow<br>(gpm) | Peak<br>Flow<br>(gpm) |
|---------------------------------------|------------------------|----------|------|-----------------------|--------------------------------|------------------------------|---------------------------|------------------------------------------------|--------------------------|-----------------------|
| ıge                                   | Harabuchi Building     | -        | -    | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Rainguage<br>Data                     | Pizza Hut Building     | -        | -    | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Rai                                   | Geotesting<br>Building | -        | -    | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| ducer                                 | Subway Site            | 7/1/2002 | -    | -                     | -                              | 2.95                         | -                         | 30.03                                          | -                        | -                     |
| Transducer<br>Data                    | Quartermaster Site     | 7/1/2002 | -    | -                     | -                              | 2.82                         | -                         | 30.65                                          | -                        | -                     |
| Middle Road<br>Manual<br>Measurements | Commonwealth           | -        | -    | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| iddle Ro<br>Manual<br>asureme         | Pizza Hut              | -        | -    | -                     | =                              | -                            | -                         | -                                              | -                        | =                     |
| Middle Road<br>Manual<br>Measurements | Subway                 | -        | -    | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| ~ Z                                   | Quartermaster          | -        | -    | =                     | -                              | -                            | -                         | =                                              | -                        | -                     |
|                                       | Drain 2                | -        | -    | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| ıal                                   | Drain 3                | -        | =    | =                     | =                              | -                            | -                         | =                                              | -                        | -                     |
| anı                                   | Drain 4                | 7/1/2002 | 1:15 | ı                     | -                              | -                            | -                         | -                                              | -                        | 106                   |
| l M                                   | Drain 5                | -        | -    | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| oad                                   | Drain 6                | 7/1/2002 | 1:08 | -                     | =                              | -                            | -                         | -                                              | -                        | 40                    |
| ıch Road Man<br>Measurments           | Drain 7                | -        | -    | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Beach Road Manual<br>Measurments      | Drain 11               | 7/1/2002 | 1:25 | -                     | -                              | -                            | -                         | -                                              | -                        | 15                    |
| Be                                    | Drain 12               | -        | -    | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
|                                       | Drain 13               | -        |      | -                     |                                | -                            | -                         | -                                              | -                        | -                     |

**Table C.16: Rain Event 5 (August 12, 2002)** 

| Мо                                    | nitor Location         | Date      | Time      | Duration<br>(minutes) | Rainfall<br>Volume<br>(inches) | Average<br>Pressure<br>(psi) | Peak<br>Pressure<br>(psi) | Average<br>Runoff Water<br>Temperature<br>(°C) | Average<br>Flow<br>(gpm) | Peak<br>Flow<br>(gpm) |
|---------------------------------------|------------------------|-----------|-----------|-----------------------|--------------------------------|------------------------------|---------------------------|------------------------------------------------|--------------------------|-----------------------|
| ıge                                   | Harabuchi Building     | -         | -         | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Rainguage<br>Data                     | Pizza Hut Building     | -         | -         | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Rain<br>I                             | Geotesting<br>Building | -         | -         | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Transducer<br>Data                    | Subway Site            | -         | -         | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Trans                                 | Quartermaster Site     | 8/12/2002 | -         | -                     | -                              | 2.81                         | -                         | 29.55                                          | -                        | -                     |
| ad<br>nts                             | Commonwealth           | -         | -         | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Middle Road<br>Manual<br>Measurements | Pizza Hut              | -         | -         | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| iddle Ro<br>Manual<br>asureme         | Subway                 | -         | -         | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Me                                    | Quartermaster          | 8/12/2002 | 9:36-9:55 | 19                    | -                              | -                            | -                         | -                                              | 80.5                     | 200                   |
|                                       | Drain 2                | 8/12/2002 | 9:15      | One reading           | -                              | -                            | -                         | -                                              | =                        | 75                    |
| lal                                   | Drain 3                | 8/12/2002 | 9:17      | One reading           | -                              | -                            | -                         | -                                              | -                        | 300                   |
| Manual                                | Drain 4                | 8/12/2002 | 9:21      | One reading           | -                              | -                            | -                         | -                                              | -                        | 428                   |
|                                       | Drain 5                | 8/12/2002 | 9:24      | One reading           | ı                              | -                            | -                         | -                                              | =                        | 150                   |
| oad                                   | Drain 6                | 8/12/2002 | 9:27      | One reading           | ı                              | -                            | -                         | -                                              | -                        | 1000                  |
| ach Road Manı<br>Measurements         | Drain 7                | 8/12/2002 | 9:29      | One reading           | -                              | -                            | -                         | -                                              | -                        | 37.5                  |
| Beach Road<br>Measurer                | Drain 11               | 8/12/2002 | 9:30      | One reading           | -                              | -                            | -                         | -                                              | -                        | 150                   |
| Be                                    | Drain 12               | 8/12/2002 | 9:31      | One reading           | -                              | -                            | -                         | -                                              | -                        | 60                    |
|                                       | Drain 13               | 8/12/2002 | 9:32      | One reading           | -                              | -                            | -                         | -                                              | -                        | 12                    |

**Table C.17: Rain Event 6 (September 18-19, 2002)** 

| Мо                                    | Monitor Location       |                         | Time                         | Duration<br>(minutes) | Rainfall<br>Volume<br>(inches) | Average<br>Pressure<br>(psi) | Peak<br>Pressure<br>(psi) | Average<br>Runoff Water<br>Temperature<br>(°C) | Average<br>Flow<br>(gpm) | Peak<br>Flow<br>(gpm) |
|---------------------------------------|------------------------|-------------------------|------------------------------|-----------------------|--------------------------------|------------------------------|---------------------------|------------------------------------------------|--------------------------|-----------------------|
| e Data                                | Harabuchi Building     | 9/18/2002-<br>9/19/2002 | 23:35 (9/18)-<br>9:47 (9/19) | 10:12                 | 0.82                           | -                            | -                         | -                                              | -                        | -                     |
| iage                                  | Pizza Hut Building     | -                       | -                            | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Rainguage Data                        | Geotesting<br>Building | 9/18/2002-<br>9/19/2002 | 23:50 (9/18)-<br>9:44 (9/19) | 9:54                  | 1.82                           | -                            | -                         | -                                              | -                        | -                     |
| ducer                                 | Subway Site            | -                       | -                            | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Transducer<br>Data                    | Quartermaster Site     | -                       | -                            | -                     | -                              | 2.86                         | -                         | 27.03                                          | -                        | -                     |
| nd<br>nts                             | Commonwealth           | -                       | -                            | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Rog<br>ual                            | Pizza Hut              | -                       | -                            | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Middle Road<br>Manual<br>Measurements | Subway                 | -                       | -                            | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Mi                                    | Quartermaster          | 9/19/2002               | 9:45-10:00                   | 15 min                | -                              | -                            | -                         | -                                              | 150                      | 200                   |
|                                       | Drain 2                | -                       | -                            | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| ıal                                   | Drain 3                | -                       | -                            | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| ant                                   | Drain 4                | -                       | -                            | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| l M                                   | Drain 5                | -                       | -                            |                       | _                              | -                            | -                         | -                                              | -                        | -                     |
| ıch Road Man<br>Measurments           | Drain 6                | -                       | -                            | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| h R<br>[eas                           | Drain 7                | -                       | -                            | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Beach Road Manual<br>Measurments      | Drain 11               | -                       | -                            | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Ř                                     | Drain 12               | -                       | -                            | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
|                                       | Drain 13               | -                       | -                            | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |

Table C.18: Rain Event 7 (September 20, 2002)

| Mo                                    | onitor Location        | Date      | Time       | Duration<br>(minutes) | Rainfall<br>Volume<br>(inches) | Average<br>Pressure<br>(psi) | Peak<br>Pressure<br>(psi) | Average<br>Runoff Water<br>Temperature<br>(°C) | Average<br>Flow<br>(gpm) | Peak<br>Flow<br>(gpm) |
|---------------------------------------|------------------------|-----------|------------|-----------------------|--------------------------------|------------------------------|---------------------------|------------------------------------------------|--------------------------|-----------------------|
| ıge                                   | Harabuchi Building     | 9/20/2002 | 1:16-9:40  | 504                   | 1.74                           | -                            | -                         | -                                              | -                        | -                     |
| Rainguage<br>Data                     | Pizza Hut Building     | -         | -          | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Rair                                  | Geotesting<br>Building | 9/20/2002 | 1:12-10:26 | 554                   | 2.68                           | -                            | -                         | -                                              | -                        | -                     |
| Transducer<br>Data                    | Subway Site            | -         | -          | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Trans                                 | Quartermaster Site     | 9/20/2002 | -          | -                     | -                              | 2.56                         | -                         | 26.2                                           | -                        | -                     |
| ad<br>ents                            | Commonwealth           | 9/20/2002 | 8:41-11:45 | 184                   | -                              | -                            | -                         | -                                              | 1150                     | >2000                 |
| Middle Road<br>Manual<br>Measurements | Pizza Hut              | 9/20/2002 | 7:35       | one reading           | -                              | -                            | -                         | -                                              | -                        | 75                    |
| idd]<br>Ma<br>asu                     | Subway                 | 9/20/2002 | 7:31       | one reading           | -                              | -                            | -                         | -                                              | -                        | 75                    |
| Me                                    | Quartermaster          | 9/20/2002 | 6:58-11:00 | 242                   | -                              | -                            | -                         | -                                              | 288                      | 600                   |
|                                       | Drain 2                | 9/20/2002 | 7:20-11:38 | 258                   | -                              | -                            | -                         | -                                              | 43                       | 43                    |
| 屋                                     | Drain 3                | -         | -          | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| anu                                   | Drain 4                | 9/20/2002 | 7:16-11:36 | 260                   | -                              | -                            | -                         | -                                              | 51.5                     | 60                    |
| ich Road Man<br>Measurments           | Drain 5                | -         | ı          | -                     | ı                              | -                            | -                         | -                                              | -                        | ı                     |
| oad                                   | Drain 6                | 9/20/2002 | 7:12-11:34 | 262                   | ı                              | -                            | -                         | -                                              | 637                      | 1200                  |
| n R                                   | Drain 7                | 9/20/2002 | 7:08-11:29 | 261                   | -                              | -                            | -                         | -                                              | 600                      | 1200                  |
| Beach Road Manual<br>Measurments      | Drain 11               | -         | -          | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
| Be                                    | Drain 12               | -         | -          | -                     | -                              | -                            | -                         | -                                              | -                        | -                     |
|                                       | Drain 13               | 9/20/2002 | 7:06-11:02 | 236                   | -                              | -                            | -                         | -                                              | 300                      | 600                   |

Table C.19: Projected Stormwater Runoff at Beach Road Drains

|          | Actual             |          | Projected Influx to Lagoon (gallons) |           |           |         |  |  |  |  |
|----------|--------------------|----------|--------------------------------------|-----------|-----------|---------|--|--|--|--|
| Location | Peak Flow<br>(gpm) | 5-minute | 10-minute                            | 20-minute | 30-minute | 1-hour  |  |  |  |  |
| Drain 2  | 75                 | 375      | 750                                  | 1,500     | 2,250     | 4,500   |  |  |  |  |
| Drain 3  | 300                | 1,500    | 3,000                                | 6,000     | 9,000     | 18,000  |  |  |  |  |
| Drain 4  | 428                | 2,140    | 4,280                                | 8,560     | 12,840    | 25,680  |  |  |  |  |
| Drain 5  | 150                | 750      | 1,500                                | 3,000     | 4,500     | 9,000   |  |  |  |  |
| Drain 6  | 1000               | 5,000    | 10,000                               | 20,000    | 30,000    | 60,000  |  |  |  |  |
| Drain 7  | 37.5               | 188      | 375                                  | 750       | 1,125     | 2,250   |  |  |  |  |
| Drain 11 | 150                | 750      | 1,500                                | 3,000     | 4,500     | 9,000   |  |  |  |  |
| Drain 12 | 60                 | 300      | 600                                  | 1,200     | 1,800     | 3,600   |  |  |  |  |
| Drain 13 | 12                 | 60       | 120                                  | 240       | 360       | 720     |  |  |  |  |
| CUMU     | JLATIVE            | 11,063   | 22,125                               | 44,250    | 66,375    | 132,750 |  |  |  |  |

During two rain events, field measurements of average and peak flow at the intersection of Quartermaster Road and Middle Road can be compared to the cumulative amount of rainfall recorded at the raingauge at the Geotesting Building. Within the 10-hour interval during the September 18-19, 2002 rain event, the raingauge at the Geotesting Building recorded 1.82 inches of cumulative rainfall (Table C.17). The peak and average runoff flow during the last 15 minutes of this rain interval were 200 gpm and 150 gpm, respectively. This translates to a stormwater runoff volume of 2,250 gallons over 15 minutes. If the average flow rate of 150 gpm was applied to half of the 10-hour interval, the resulting estimate would be 45,000 gallons over five hours.

During a nine-hour interval on September 20, 2002, the raingauge at the Geotesting Building recorded 2.68 inches of cumulative rainfall (Table C.18). The peak and average runoff flow during the last four hours of this interval were 600 gpm and 288 gpm, respectively. This translates to a stormwater runoff volume of nearly 700,000 gallons over four hours. Although no additional rainfall data has been collected at the study area since 2002, the 2002 data indicates that large volumes of runoff from the steep upper/inland portion of the watershed flows down onto Beach Road and enters the lagoon via surface sheet flow during large rain events.

## C.7.2 SEDIMENT DELTA SURVEYS

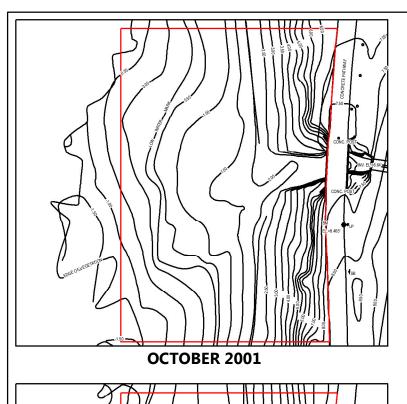
In an effort to quantify the sediment load entering the lagoon via stormwater runoff, three sediment deltas were surveyed five times from 2001 to 2002, during both the wet and dry seasons. Sediment deltas at Drains 4, 6, and 11 were surveyed. The approximate volumes of the sediment deltas are presented in Table C.20. Figures C.5 through C.7 depict sediment delta contours based on survey points established during five discrete monitoring events and present a comparison between the measured delta volumes and the corresponding monthly rainfall data during each monitoring event.

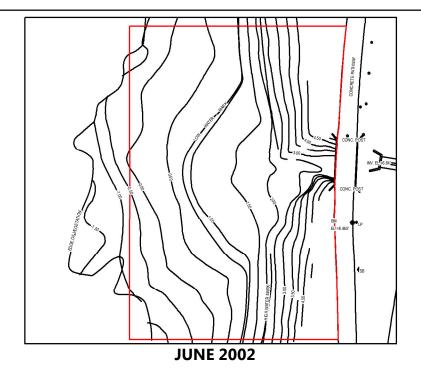
**Table C.20: Sediment Delta Volumes** 

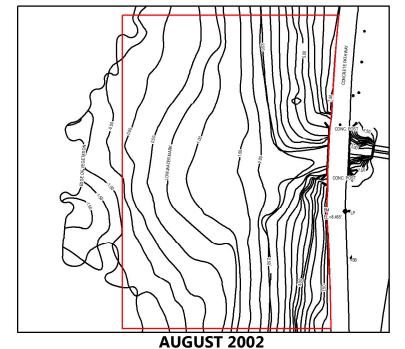
| DRAIN<br>LOCATION | DATE OF<br>MEASUREMENT | SEASON | APPROXIMATE<br>DELTA<br>VOLUME | CHANGE OF<br>VOLUME<br>(cubic yards) |                  |  |
|-------------------|------------------------|--------|--------------------------------|--------------------------------------|------------------|--|
|                   |                        |        | (cubic yards)                  | Net                                  | From<br>Previous |  |
|                   | Oct-01                 | Wet    | 2473                           | NA                                   | NA               |  |
|                   | Jun-02                 | Dry    | 2478                           | 5                                    | 5                |  |
| Drain 4           | Aug-02                 | Wet    | 2778                           | 305                                  | 300              |  |
|                   | Oct-02                 | Wet    | 2442                           | -31                                  | -336             |  |
|                   | Dec-02                 | Dry    | 2438                           | -35                                  | -4               |  |
|                   | Oct-01                 | Wet    | 2286                           | NA                                   | NA               |  |
|                   | Jun-02                 | Dry    | 2416                           | 130                                  | 130              |  |
| Drain 6           | Aug-02                 | Wet    | 2336                           | 50                                   | -80              |  |
|                   | Oct-02                 | Wet    | 2332                           | 46                                   | -4               |  |
|                   | Dec-02                 | Dry    | 2383                           | 97                                   | 51               |  |
|                   | Oct-01                 | Wet    | 1705                           | NA                                   | NA               |  |
|                   | Jun-02                 | Dry    | 1757                           | 52                                   | 52               |  |
| Drain 11          | Aug-02                 | Wet    | 1786                           | 81                                   | 29               |  |
|                   | Oct-02                 | Wet    | 1732                           | 27                                   | -54              |  |
|                   | Dec-02                 | Dry    | 1750                           | 45                                   | 18               |  |

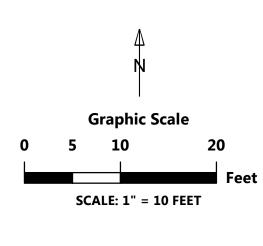
NA = not applicable

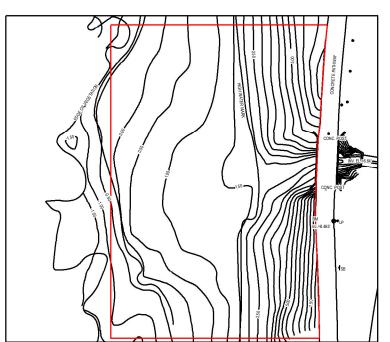
The change in sediment delta volume throughout the study interval was notable, particularly at Drain 4. The sediment delta adjacent to Drain 4 increased by nearly 300 cubic yards from June 2002 to August 2002, and then decreased by 336 cubic yards from August 2002 until October 2002. The monthly rainfall in August 2002 was 11.46 inches, which likely contributed to the loss of sediment from this delta. The volume of sediment lost was most likely washed into the lagoon during the two-month period. The sediment deltas at Drain 6 and Drain 11 also experienced gains and losses of sediment, although



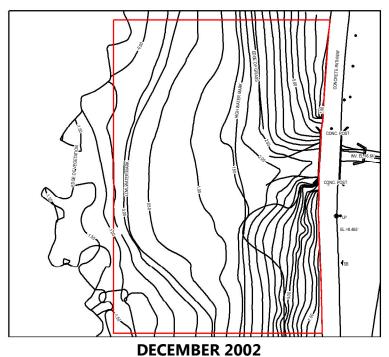


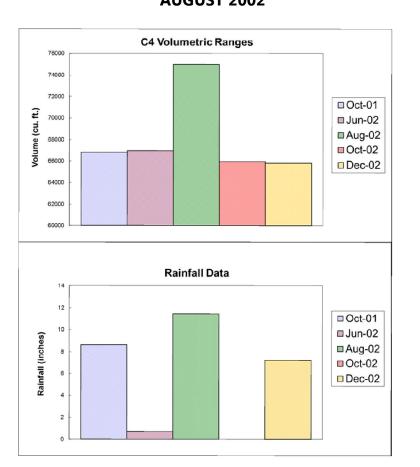






OCTOBER 2002



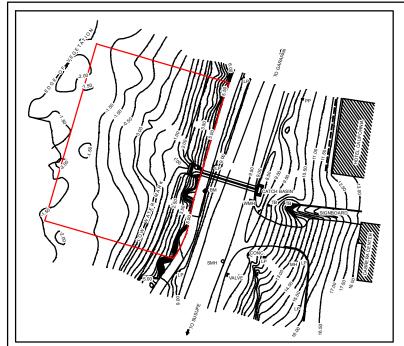


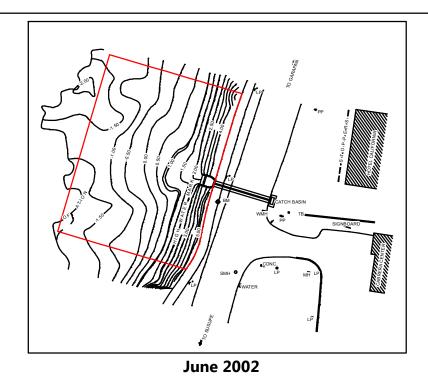
Legend

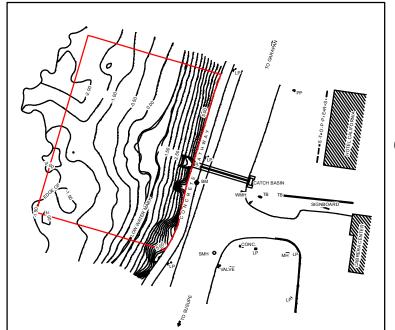
- Area of Delta Volume Comparision

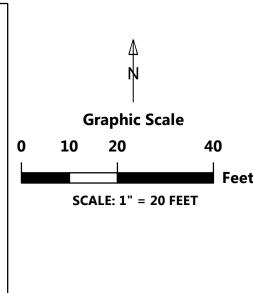


| PROJECT NO.: 1057        |  |
|--------------------------|--|
| DATE: SEPTEMBER 20, 2012 |  |
| DRAWN BY: CB             |  |
| REVIEWED BY: MA          |  |

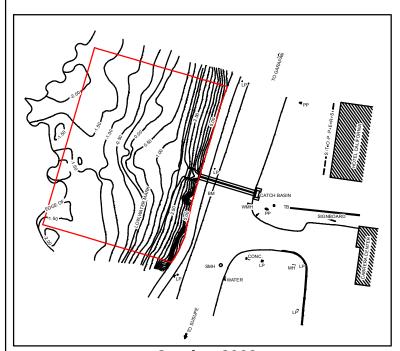


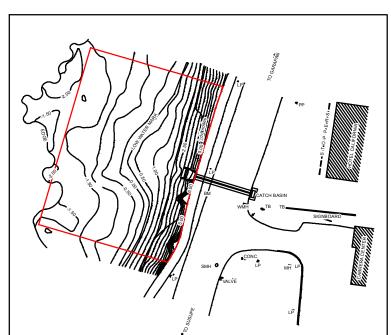






October 2001





December 2002

August 2002 C6 Volumetric Ranges □ Oct-01 ■ Jun-02 ■ Aug-02 ■ Oct-02 □Dec-02 Rainfall Data □ Oct-01 ■ Jun-02 ■Aug-02 ■ Oct-02 □Dec-02

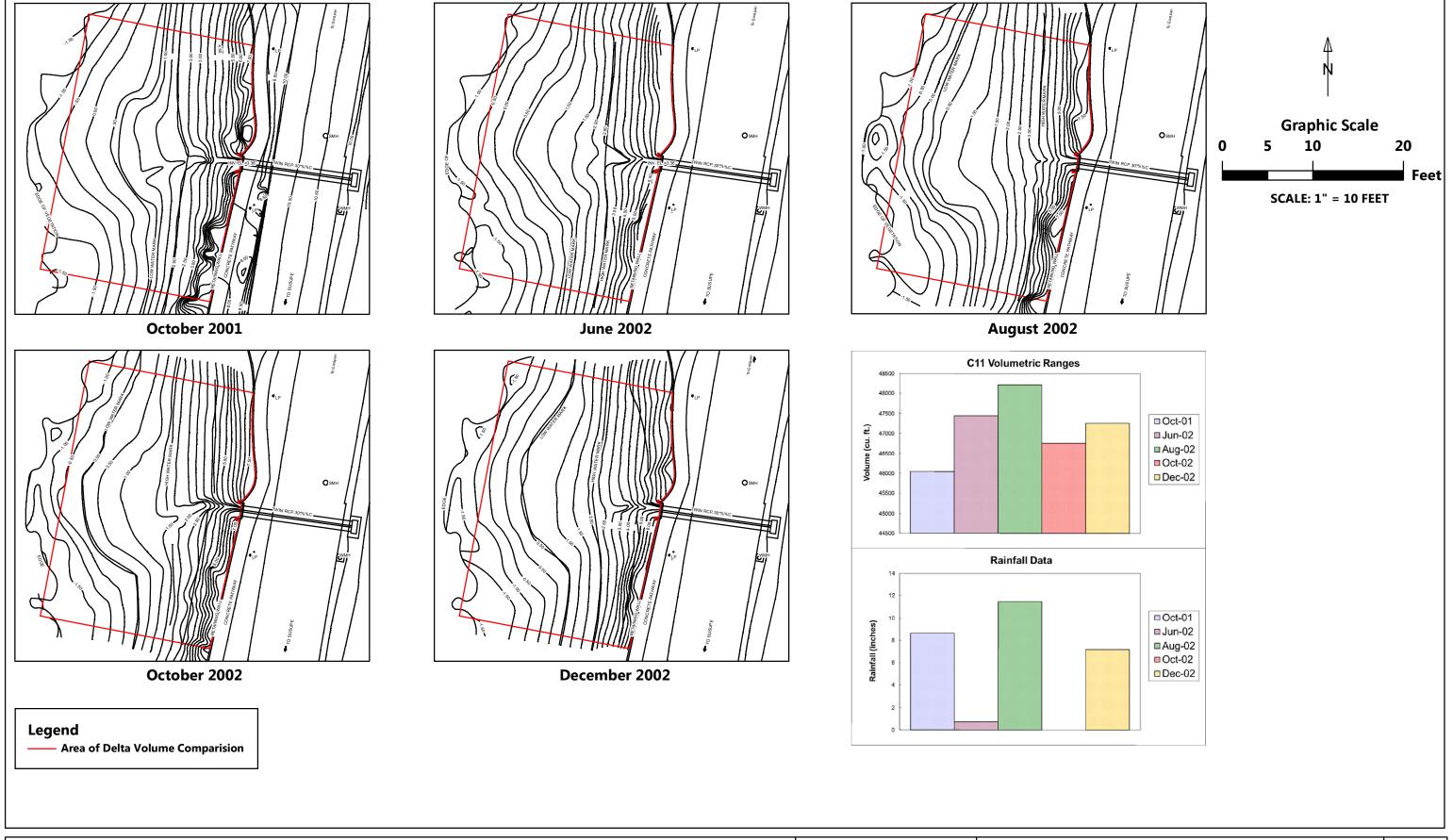
October 2002

Legend

—— Area of Delta Volume Comparision

| - Environet, | Inc. |
|--------------|------|
|--------------|------|

| PROJECT NO.: 1057        |  |
|--------------------------|--|
| DATE: SEPTEMBER 20, 2012 |  |
| DRAWN BY: CB             |  |
| REVIEWED BY: MA          |  |





| PROJECT NO.: 1057        | ECOSYSTEM RESTORATION REPORT                      |
|--------------------------|---------------------------------------------------|
| DATE: SEPTEMBER 20, 2012 | SAIPAN LAGOON AQUATIC ECOSYSTEM RESTORATION STUDY |
| DRAWN BY: CB             | DRAIN 11 SEDIMENT DELTA SURVEYS                   |
| REVIEWED BY: MA          | SAIPAN, CNMI                                      |

FIGURE C.7

not as much as Drain 4 and at different times of the year. The sediment delta volume at Drain 6 decreased from June 2002 to October 2002, and increased from October 2002 to December 2002. The total volume of sediment lost from the three deltas during the study interval was 478 cubic yards.

In addition to the field studies collected during this portion of the study, a watershed analysis was performed for the site using the computer software program Hydrologic Modeling System HEC-HMS (Community Planning & Engineering, Inc., 2012). The watershed analysis used storm event data from the *Rainfall-Frequency Study, Saipan, CNMI* (Environet, 2003). The watershed analysis report and the resulting drainage design are included as Appendix E of the Ecosystem Restoration Report (ERR).

#### REFERENCES

Community Planning & Engineering, Inc., 2012. Preliminary Drainage Design for Aquatic Ecosystem Restoration Study, Saipan Lagoon, Saipan, Northern Mariana Islands. January.

Environet, 2003. Rainfall-Frequency Study, Saipan, Commonwealth of Northern Marianas Islands. Report prepared for the U.S Army Corps of Engineers, dated April 2003.

C.8
Lagoon Water Quality Investigation

#### APPENDIX C.8

#### LAGOON WATER QUALITY INVESTIGATION

In order to obtain general lagoon water quality data, lagoon water samples were collected by the Commonwealth of the Northern Mariana Islands (CNMI) Division of Environmental Quality (DEQ) personnel from February 2002 to February 2003. Samples were collected in nearshore waters adjacent to Drains 4, 6, 11, and 14 (Figure C.8). Samples were analyzed for microbiological and chemical parameters by the DEQ Environmental Surveillance Laboratory.

Table C.21 summarizes the water sample analytical results collected at Drains 4, 6, 11, and 14 from February 2002 to February 2003. The analytical results were compared against the CNMI water quality criteria for Class AA marine waters (DEQ, 2010). Water quality standards for several of the parameters (salinity, temperature, and turbidity) are in terms of deviation from ambient conditions. Ambient conditions have not been specified for the lagoon area; therefore, determining water standard exceedances is difficult for these parameters. In Table C.21, a turbidity of 2.5 was considered as the value for a healthy reef system, thus values exceeding 2.5 were shaded to indicate an exceedance. During the 2002-2003 sampling period, water quality standard exceedances were regularly observed for instantaneous enterococci measurements, dissolved oxygen (DO), turbidity, hydrogen activity (pH), nitrate, and orthophosphate, although strong correlations were not noted. The nutrients nitrate and orthophosphate currently have not been monitored by DEQ for more than six years because of the known problems with the accuracy of the previously used spectrophotometer method and because of unacceptable quality control samples. The accuracy of the nutrient data collected during the 2002-2003 sampling period may be questionable, nonetheless it was included here as a reference.

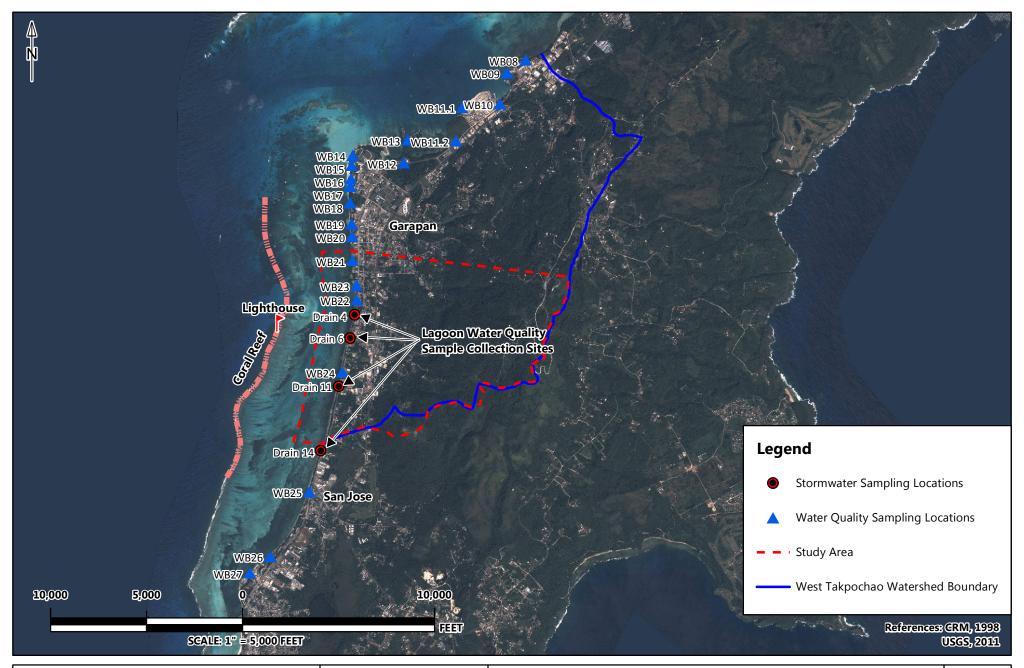
Average values of the water quality sample results for the 2002-2003 sampling period during the wet season (July through November) and dry season (December through June) were calculated for all parameters except fecal coliform and are presented in Table C.22. Enterococci values were consistently higher at all four sample locations during the wet season than during the dry season, as was turbidity at Drains 4, 6, and 11. Salinity was consistently higher during dry season sampling events at all four sample locations, as were DO and chloride. These patterns fit the general presumption that nearshore lagoon waters are affected by an increased volume of stormwater runoff during the rainy season, leading to an increase in turbidity and microbial contamination. During the dry season, less freshwater runoff is experienced, leading to higher salinities and chlorides, and lower turbidity and less microbial contamination.

The DEQ currently monitors 38 fixed stations along Saipan's most used west coast beaches on a weekly basis for microbiological and chemical parameters. Four of these fixed stations (WB 21, WB 22, WB 23, and WB 24) occur within the study area (Figure C.8). Table C.23 presents the data collected at these four stations from July 2010 to June 2011. During the 2010-2011 monitoring period, water quality standard exceedances were regularly observed for instantaneous and geomean (GM) enterococci measurements, DO, turbidity, and pH, although strong correlations among the measured parameters were not noted. As mentioned earlier, nutrient data during this sampling period is not available.

As a comparison, average values of the 2010-2011 monitoring data for the wet season and dry season were also calculated. Results are presented in Table C.24. A significant correlation was not observed between seasonal discharges and water quality parameters during the 2010-2011 sampling period, suggesting that other factors are also contributing to the observed contaminant loadings entering the lagoon. These factors may include periodic releases of pollutants not associated with rainfall, a better system of contaminant uptake, a natural filtration or buffering of stormwater runoff prior to discharging into the lagoon, or a difference in upgradient land use.

#### REFERENCES

DEQ, 2010. Commonwealth of the Northern Mariana Islands Integrated 305(b) and 303 (d) Water Quality Assessment Report. November.





| PROJECT NO.: 1057        | ECOSYSTEM RESTORATION REPORT                      |        |
|--------------------------|---------------------------------------------------|--------|
| DATE: SEPTEMBER 20, 2012 | SAIPAN LAGOON AQUATIC ECOSYSTEM RESTORATION STUDY | FIGURE |
| DRAWN BY: CB             | WEEKLY WATER QUALITY SAMPLING LOCATIONS           | C.8    |
| REVIEWED BY: MA          | SAIPAN, CNMI                                      |        |

Table C.21: Lagoon Water Quality Results, 2002-2003

|                        |                |                      | Fecal                 |                             | C-1!!4                    | Dissolved                                        | Т                                | T1:1:4                          | ,          |                     | DO.                       |                    |
|------------------------|----------------|----------------------|-----------------------|-----------------------------|---------------------------|--------------------------------------------------|----------------------------------|---------------------------------|------------|---------------------|---------------------------|--------------------|
| Date                   | Time           | Site                 | Coliform (CFU/100 ml) | Enterococci<br>(CFU/100 ml) | Salinity (‰) <sup>2</sup> | Oxygen<br>(%)                                    | Temperature<br>(°C) <sup>2</sup> | Turbidity<br>(NTU) <sup>2</sup> | pН         | Nitrate<br>(mg/L)   | PO <sub>4</sub><br>(mg/L) | Chloride<br>(mg/L) |
| Date                   | Time           | Site                 | $GM^1 < 200$ ,        | ,                           | (700)                     | (70)                                             | ( C)                             | (1110)                          | pm         | (IIIg/L)            | (IIIg/L)                  | (Hig/L)            |
| CNMI W                 | ater Quality S | tandards             | <400 Single           | $GM^1 < 35, <104$           | 10                        | >75                                              | 1.0                              | 0.5                             | 7.6 - 8.6  | < 0.2               | < 0.025                   | NA                 |
|                        |                |                      | Sample*               | Single Sample               |                           |                                                  |                                  |                                 |            |                     |                           |                    |
| 2/13/2002              | 913            | Drain 4              | -                     | 0                           | 33                        | 58.1                                             | 26.8                             | 230                             | 7.9        | 0                   | -                         | -                  |
| 2/13/2002              | 918            | Drain 6              | <del></del>           | 10                          | 33                        | 57.5                                             | 27.2                             | 82                              | 7.9        | 0.1                 | -                         | -                  |
| 2/13/2002<br>2/13/2002 | 922<br>858     | Drain 11<br>Drain 14 | -                     | 31<br>74                    | 33<br>29                  | <b>66.7</b> 75.2                                 | 26.9<br>26.1                     | 170                             | 8          | 0.15                | -                         | -                  |
| 2/28/2002              | 1108           | Drain 4              | _                     | 0                           | 33                        | 99.5                                             | 27.6                             | 1.8                             | 8.1        | 0                   | _                         | -                  |
| 2/28/2002              | 1113           | Drain 6              | -                     | 10                          | 33                        | 80.7                                             | 27.5                             | 2                               | 8.2        | 0.13                | -                         | -                  |
| 2/28/2002              | 1118           | Drain 11             | -                     | 20                          | 33                        | 69.3                                             | 27.3                             | 5.5                             | 8          | 0.16                | -                         | -                  |
| 2/28/2002              | 1123           | Drain 14             | -                     | 10                          | 33                        | 88.6                                             | 27.3                             | 1.3                             | 8.1        | 0.13                | -                         | -                  |
| 3/6/2002               | 1110           | Drain 4              | -                     | 10                          | 28                        | 126.1                                            | 29.4                             | 4.1                             | 8.1        | 0                   | 0.04                      | 19629              |
| 3/6/2002               | 1116           | Drain 6              | -                     | 0                           | 30                        | 132.8                                            | 29                               | 3                               | 8.1        | 0.1                 | 0.02                      | 19883              |
| 3/6/2002               | 1038           | Drain 11             | -                     | 10                          | 31                        | 119.7                                            | 28.6                             | 2.9                             | 8.1        | 0.13                | 0.03                      | 20394              |
| 3/6/2002               | 1024           | Drain 14             | -                     | 0                           | 32                        | 152.8                                            | 27.2                             | 0.85                            | 8.1        | 0.03                | 0.03                      | 19883              |
| 3/13/2002              | 1057<br>1053   | Drain 4              | -                     | 0                           | 32<br>32                  | 127.2                                            | 29.6                             | 7<br>3.8                        | 8          | 0.04                | 0.24                      | 19884<br>40276     |
| 3/13/2002              | 1033           | Drain 6<br>Drain 11  | -                     | 0                           | 31                        | -                                                | -                                | 5.3                             | -          | 0                   | 0.03                      | 17844              |
| 3/13/2002              | 1038           | Drain 14             | _                     | 30                          | 30                        | 86.4                                             | 28.5                             | 1.9                             | 8.2        | 0                   | 0.03                      | 15295              |
| 3/20/2002              | 1038           | Drain 4              | _                     | 10                          | 29                        | 94                                               | 29.1                             | 5.2                             | 8.1        | 0                   | ND                        | -                  |
| 3/20/2002              | 1033           | Drain 6              | -                     | 0                           | 33                        | 111.5                                            | 29.4                             | 3.2                             | 8          | 0.09                | ND                        | -                  |
| 3/20/2002              | 1028           | Drain 11             |                       | 97                          | 32                        | 79.5                                             | 29.1                             | 3.3                             | 8.1        | 0                   | ND                        |                    |
| 3/20/2002              | 1017           | Drain 14             | -                     | 0                           | 32                        | 85.3                                             | 29.9                             | 0.75                            | 8.1        | 0                   | ND                        |                    |
| 3/26/2002              | 1042           | Drain 4              | -                     | 0                           | 30                        | 86.8                                             | 30                               | 7.3                             | 8.2        | 0.18                | -                         | -                  |
| 3/26/2002              | 1037           | Drain 6              | -                     | 10                          | 32                        | 102                                              | 29                               | 8.9                             | 8.1        | 0                   | -                         | -                  |
| 3/26/2002              | 1031           | Drain 11             | -                     | 0                           | 32                        | 81.9                                             | 29.5                             | 7.6                             | 7.9        | 0                   | -                         | -                  |
| 3/26/2002              | 1017           | Drain 14             | -                     | 30                          | 32                        | 94                                               | 29.1                             | 1.5                             | 8.1        | 0                   | -                         | -                  |
| 4/3/2002               | 918            | Drain 4              | -                     | 31                          | 31                        | 97.2                                             | 28.9                             | 8.5                             | 8          | 0                   | 0.03                      | -                  |
| 4/3/2002               | 913            | Drain 6              | -                     | 0                           | 33<br>32                  | 109.3                                            | 28.7                             | 3.6                             | 8.1        | 0                   | 0.07                      | -                  |
| 4/3/2002<br>4/3/2002   | 908<br>853     | Drain 11<br>Drain 14 | -                     | 30<br>0                     | 32                        | 121.4<br>117.3                                   | 28.8<br>28.8                     | 3.44<br>2.5                     | 8.1<br>8.1 | 0.11                | ND<br>ND                  | <del>-</del>       |
| 4/3/2002               | 853<br>853     | Drain 14 Drain 4     | -                     | 41                          | 33                        | 103.7                                            | 28.8                             | 6.8                             | 8.1        | 0                   | ND<br>ND                  | <del>-</del>       |
| 4/10/2002              | 847            | Drain 6              | -                     | 0                           | 33                        | 103.7                                            | 29.1                             | 3.4                             | 8.2        | 0                   | ND<br>ND                  | -                  |
| 4/10/2002              | 842            | Drain 11             | -                     | 10                          | 33                        | 121.3                                            | 28.7                             | 1.2                             | 8.1        | 0.01                | ND                        | -                  |
| 4/10/2002              | 830            | Drain 14             | -                     | 10                          | 33                        | 102.8                                            | 28.5                             | 1.6                             | 8          | 0                   | ND                        | -                  |
| 5/1/2002               | 931            | Drain 4              | -                     | 20                          | 32                        | -                                                | 29.7                             | 4.7                             | 8          | -                   | ND                        | -                  |
| 5/1/2002               | 925            | Drain 6              | -                     | 0                           | 31                        | -                                                | 29.4                             | 3.6                             | 8          | -                   | ND                        | -                  |
| 5/1/2002               | 918            | Drain 11             | -                     | 10                          | 33                        | -                                                | 30.5                             | 2.8                             | 7.9        | -                   | ND                        | -                  |
| 5/1/2002               | 904            | Drain 14             | -                     | 30                          | 33                        | 123.5                                            | 29.6                             | 1.1                             | 8.1        | -                   | ND                        | -                  |
| 5/8/2002               | 1058           | Drain 4              | -                     | 10                          | 27                        | -                                                | 30.8                             | 7.7                             | 8          | -                   | 0.009                     | 18994              |
| 5/8/2002               | 1051           | Drain 6              | -                     | 0                           | 29                        | -                                                | 30.3                             | 2.5                             | 8          | -                   | 0.013                     | 19494              |
| 5/8/2002               | 1037           | Drain 11             | -                     | 0                           | 28                        | -                                                | 31.3                             | 3.9                             | 7.9        | -                   | 0.02                      | 18994              |
| 5/8/2002<br>5/15/2002  | 1025<br>907    | Drain 14<br>Drain 4  | <u>-</u>              | 0                           | 31                        | -                                                | 29.9                             | 1.7                             | 8.2<br>7.9 | 0.4                 | 0.019<br>0.014            | 19993<br>19994     |
| 05/1502                | 912            | Drain 6              | _                     | 63                          | _                         |                                                  | _                                | 1.1                             | 7.9        | 0.4                 | 0.326                     | 18994              |
| 5/15/2002              | 918            | Drain 11             | <del>-</del>          | 20                          |                           |                                                  | _                                | 2.6                             | 8          | 0.18                | 0.023                     | 19994              |
| 5/15/2002              | 927            | Drain 14             | _                     | 0                           | -                         | -                                                | _                                | 2.2                             | 8.2        | 0                   | 0.013                     | 19994              |
| 5/22/2002              | 853            | Drain 4              | -                     | 0                           | 31                        | -                                                | 29.1                             | 1.6                             | 7.9        | 0                   | -                         | -                  |
| 5/22/2002              | 903            | Drain 6              | -                     | 20                          | 30                        | =                                                | 29.2                             | 0.95                            | 8          | 0                   | -                         | -                  |
| 5/22/2002              | 909            | Drain 11             | -                     | 20                          | 31                        | -                                                | 29.2                             | 1.5                             | 7.9        | 0                   | -                         | -                  |
| 5/22/2002              | 0923           | Drain 14             | -                     | 10                          | 30                        | -                                                | 29.4                             | 0.9                             | 8          | 0                   | -                         | -                  |
| 5/29/2002              | 1002           | Drain 4              | -                     | 727                         | 30                        | -                                                | 30.4                             | 4                               | 8          | 0                   | -                         | 19494              |
| 5/29/2002              | 1015           | Drain 6              | -                     | 84                          | 30                        | <del>  -</del>                                   | 30.3                             | 3.6                             | 8          | 0                   | -                         | 19994              |
| 5/29/2002              | 1028           | Drain 11             | -                     | 20                          | 30                        | - '                                              | 31.5                             | 4.3                             | 8          | 0                   | -                         | 19494              |
| 5/29/2002              | 1053           | Drain 14             | -                     | 96<br>73                    | 30                        | <del>                                     </del> | 32                               | 1.4                             | 8.1        | 0                   | 0.002                     | 19994              |
| 6/5/2002<br>6/5/2002   | 1012<br>1008   | Drain 4<br>Drain 6   | -                     | 73<br>73                    | 33<br>33                  | -                                                | 30.6<br>30.5                     | 10<br>2.5                       | 8.1<br>8.1 | 0                   | 0.063<br>0.028            | 18994<br>19994     |
| 6/5/2002               | 1008           | Drain 6 Drain 11     | -                     | 272                         | 33                        | <del>-</del>                                     | 31.5                             | 2.5                             | 8.1        | 0                   | 0.028                     | 19994              |
| 6/5/2002               | 951            | Drain 14             | -                     | 10                          | 33                        | -                                                | 30.9                             | 4                               | 8.2        | 0                   | 0.314                     | 18994              |
| 6/12/2002              | 939            | Drain 4              | -                     | 0                           | 30                        | -                                                | -                                | 3.7                             | 8.1        | 0                   | -                         | 18494              |
| 6/12/2002              | 1002           | Drain 6              | -                     | 0                           | 30                        | -                                                | -                                | 1.6                             | 8          | 0                   | -                         | 19994              |
| 6/12/2002              | 1019           | Drain 11             | -                     | 0                           | 30                        | -                                                | -                                | 2.7                             | 8.1        | 0                   | -                         | 18994              |
| 6/12/2002              | 1037           | Drain 14             | -                     | 0                           | 30                        | -                                                | -                                | 0.9                             | 8.1        | 0                   | -                         | 18994              |
| 6/19/2002              | 1003           | Drain 4              | -                     | 30                          | 30                        | -                                                | -                                | 5.7                             | 8.2        | -                   | -                         | -                  |
| 6/19/2002              | 1040           | Drain 6              | -                     | 0                           | 32                        | -                                                | -                                | 1.2                             | 8.2        | -                   | -                         | -                  |
| 6/19/2002              | 1055           | Drain 11             | -                     | 0                           | 30                        | -                                                | -                                | 4.7                             | 8.1        | -                   | -                         | -                  |
| 6/19/2002              | 1115           | Drain 14             | -                     | 0                           | 30                        | -                                                | 20.4                             | 0.85                            | 8.2        | -                   | -                         | <del>-</del>       |
| 6/26/2002<br>6/26/2002 | 1000<br>949    | Drain 4<br>Drain 6   | <u>-</u>              | 0<br>10                     | 32<br>31                  | <del>-</del>                                     | 30.4<br>31                       | 1.5<br>3.5                      | 8          | 0                   | -                         | <del>-</del>       |
| 6/26/2002              | 949            | Drain 6 Drain 11     | -                     | 0                           | 32                        | <del>-</del>                                     | 30.2                             | 2.1                             | 7.9        | 0                   | -                         | -                  |
| 6/26/2002              | 936            | Drain 14             | -                     | 86                          | 33                        | -                                                | 30.2                             | 7.5                             | 7.9        | 0                   | _                         |                    |
| 7/1/2002               | 115            | Drain 4              | -                     | >24192                      | 0                         | -                                                | 27.1                             | 1000                            | 8.4        | 0                   | 0.354                     | -                  |
| 7/1/2002               | 108            | Drain 6              | -                     | 198628                      | 0                         | -                                                | 27.1                             | 159                             | 8.27       | 0                   | 0.886                     | -                  |
| 7/1/2002               | 125            | Drain 11             | -                     | >24192                      | 0                         | -                                                | 27.4                             | 337                             | 8.56       | 0                   | 0.374                     |                    |
| 7/2/2002               | 1027           | Drain 4              | -                     | 703                         | 30                        | -                                                | 29.4                             | 69.1                            | 7.97       | 0                   | 0.18                      | 20494              |
| 7/2/2002               | 1023           | Drain 6              | -                     | 959                         | 29                        | -                                                | 29.3                             | 52                              | 8          | 0                   | 0.22                      | 20494              |
| 7/2/2002               | 1018           | Drain 11             | - '                   | 839                         | 29                        | <u> </u>                                         | 29.6                             | 24.8                            | 8.01       | 0                   | 0.201                     | 20993              |
| 7/2/2002               | 1007           | Drain 14             | -                     | 905                         | 28                        | -                                                | 29.6                             | 39.9                            | 8.05       | 0                   | 0.171                     | 21993              |
| 7/10/2002              | 953            | Drain 4              | -                     | <1                          | 33                        | -                                                | 28.1                             | 5.99                            | 8.1        | 0.2                 | 0.242                     | 21993              |
| 7/10/2002              | 1000           | Drain 6              | -                     | 41                          | 33                        | <del>                                     </del> | 28.5                             | 5.16                            | 8.2        | 0.39                | 0.119                     | 20494              |
| 7/10/2002<br>7/10/2002 | 1008<br>1021   | Drain 11<br>Drain 14 | -                     | <1<br>20                    | 35<br>35                  | _                                                | 27.8<br>28.6                     | 3.44<br>7.56                    | 8.2<br>8.2 | <b>0.28</b><br>0.19 | 0.168<br>0.107            | 21493<br>20993     |
| 7/10/2002              |                |                      | -                     |                             |                           | -                                                |                                  |                                 |            |                     |                           | 20773              |
|                        | 1009           | Drain 4              |                       | / <i>/</i>                  | 1 10                      |                                                  | 799                              | 4 0 1                           | 81         |                     | 0.142                     | -                  |
| 7/17/2002              | 1009<br>1021   | Drain 4 Drain 6      | -                     | <1<br><1                    | 30<br>32                  | -                                                | 29.9<br>30                       | 4.61<br>6.02                    | 8.1<br>8.1 | 0                   | 0.142<br>0.117            | -                  |

Table C.21: Lagoon Water Quality Results, 2002-2003

|                        |                |                      | Fecal                    |                             | C-1!!4                    | Dissolved     | Т                                | T1:1:4                          |           |                   | DO.                       |                    |
|------------------------|----------------|----------------------|--------------------------|-----------------------------|---------------------------|---------------|----------------------------------|---------------------------------|-----------|-------------------|---------------------------|--------------------|
| Date                   | Time           | Site                 | Coliform<br>(CFU/100 ml) | Enterococci<br>(CFU/100 ml) | Salinity (‰) <sup>2</sup> | Oxygen<br>(%) | Temperature<br>(°C) <sup>2</sup> | Turbidity<br>(NTU) <sup>2</sup> | рH        | Nitrate<br>(mg/L) | PO <sub>4</sub><br>(mg/L) | Chloride<br>(mg/L) |
| Date                   | Time           | Site                 | GM <sup>1</sup> <200,    | , ,                         | (700)                     | (70)          | ( C)                             | (1110)                          | hii       | (IIIg/L)          | (IIIg/L)                  | (IIIg/L)           |
| CNMI W                 | ater Quality S | tandards             | <400 Single              | GM <sup>1</sup> <35, <104   | 10                        | >75           | 1.0                              | 0.5                             | 7.6 - 8.6 | < 0.2             | < 0.025                   | NA                 |
|                        |                |                      | Sample*                  | Single Sample               |                           |               |                                  |                                 |           |                   |                           |                    |
| 7/17/2002              | 1027           | Drain 11             | -                        | <1                          | 32                        | -             | 29.7                             | 3.23                            | 8.1       | 0                 | 0.116                     | -                  |
| 7/17/2002              | 1032           | Drain 14             | -                        | <1                          | 32                        | -             | 29.7                             | 4.36                            | 8         | 0.04              | 0.083                     | -                  |
| 7/24/2002              | 945            | Drain 4              | -                        | >24192                      | 0                         | -             | -                                | 69                              | 8.3       | 0                 | 0.617                     | -                  |
| 7/24/2002              | 952            | Drain 6              | 24191.7                  | -                           | 28.1                      | 82            | 27.1                             | 54                              | 7.9       | 0                 | 0.251                     | -                  |
| 7/24/2002              | 1000           | Drain 11             | -                        | >24192                      | 0                         | -             | -                                | 110                             | 8.2       | 0                 | 0.296                     | -                  |
| 7/24/2002              | 1150           | Drain 14             | -                        | 14136                       | 0                         | -             | -                                | 50                              | 8.5       | 0                 | 0.324                     |                    |
| 7/31/2002              | 950            | Drain 4              | -                        | 3130                        | 29                        | -             | -                                | 6                               | 8         | 0.02              | 0.052                     | -                  |
| 7/31/2002              | 955            | Drain 6              | -                        | 256                         | 30                        | -             | -                                | 2.5                             | 7.9       | 0.06              | 0.166                     | -                  |
| 7/31/2002              | 1001           | Drain 11             | -                        | 73                          | 30                        | -             | -                                | 1.8                             | 7.9       | 0.21              | 0.073                     | -                  |
| 7/31/2002              | 1010           | Drain 14             | -                        | <1                          | 30                        | -             | - 20.7                           | 1.2                             | 8.2       | 0.02              | 0.258                     | -                  |
| 8/7/2002               | 1006           | Drain 4              | -                        | 4106                        | 30                        | -             | 30.5                             | 8.64                            | 7.9       | 0                 | 0.191                     | -                  |
| 8/7/2002<br>8/7/2002   | 1000<br>953    | Drain 6<br>Drain 11  | -                        | 98<br>94                    | 31                        | -             | 30<br>30.7                       | 7.15<br>12.2                    | 8.2<br>8  | 0.09              | 0.105<br>0.161            | -                  |
| 8/7/2002               | 933            | Drain 11 Drain 14    | -                        | 94<br><1                    | 31                        | -             | 30.7                             | 1.66                            | 8.3       | 0.09              | 0.161                     | -                  |
| 8/13/2002              | 943<br>818     | Drain 14 Drain 4     | -                        | >24192                      | -                         | -             | 30.1                             | 1.00                            | - 8.3     | 0                 | 0.144                     | <del>-</del>       |
| 8/13/2002              | 835            | Drain 6              | _                        | >24192                      | -                         | -             | -                                | -                               | -         | 0                 | 0.499                     | -                  |
| 8/13/2002              | 846            | Drain 11             | _                        | >24192                      |                           |               |                                  |                                 |           | 0                 | 3.446                     | <del></del>        |
| 8/14/2002              | 942            | Drain 4              | _                        | -                           | 30                        | _             | 30.8                             |                                 | 7.9       | _                 | 5.770                     | <del>-</del>       |
| 8/14/2002              | 955            | Drain 6              | _                        | 30                          | 29                        | _             | 31.3                             | 1.1                             | 7.9       | 0                 | 0.051                     | 18994              |
| 8/14/2002              | 1007           | Drain 11             | -                        | <1                          | 30                        | _             | 31.6                             | 2.3                             | 7.9       | 0.02              | 0.065                     | 18494              |
| 8/14/2002              | 1025           | Drain 14             | -                        | <1                          | 30                        | _             | 30.6                             | 1.9                             | 8         | 0.02              | 0.078                     | 17994              |
| 8/21/2002              | 946            | Drain 4              | -                        | <1                          | -                         | 79.4          | 30.1                             | 2.7                             | 8         | 0                 | 0.114                     | -                  |
| 8/21/2002              | 952            | Drain 6              | -                        | <1                          | -                         | 78.4          | 30.1                             | 1.8                             | 8.1       | 0                 | 0.115                     | -                  |
| 8/21/2002              | 958            | Drain 11             | -                        | <1                          | -                         | 74.6          | 29.8                             | 1.2                             | 8         | 0                 | 0.124                     | -                  |
| 8/21/2002              | 1012           | Drain 14             | -                        | -                           |                           | 77.5          | 29.6                             | 1.3                             | 8.1       | 0                 | 0.074                     | -                  |
| 8/28/2002              | 955            | Drain 4              |                          | 24191.7                     | 26                        | -             | 28.8                             | 56                              | 7.8       | 0                 | 8.364                     | -                  |
| 8/28/2002              | 1002           | Drain 6              |                          | 15530.7                     | 27                        |               | 28.6                             | 15                              | 7.8       | 0                 | 1.582                     |                    |
| 8/28/2002              | 1012           | Drain 11             | -                        | 2310                        | 28                        | -             | 28.5                             | 17                              | 7.8       | 0                 | 2.064                     | -                  |
| 8/28/2002              | 1032           | Drain 14             | -                        | 1455                        | 30                        | -             | 28.4                             | 4.2                             | 7.8       | 0                 | 0.02                      | -                  |
| 9/4/2002               | 943            | Drain 4              | -                        | 41                          | 18                        | -             | 31.1                             | 2.7                             | 7.8       | 0.65              | 0.047                     | -                  |
| 9/4/2002               | 955            | Drain 6              | -                        | 20                          | 25                        | -             | 31.2                             | 3.5                             | 7.9       | 0                 | 0.092                     | -                  |
| 9/4/2002               | 1004           | Drain 11             | -                        | <1                          | 26                        | -             | 31.2                             | 2.1                             | 7.9       | 0                 | 0.082                     | -                  |
| 9/4/2002               | 1022           | Drain 14             | -                        | <1                          | 23                        | -             | 30.8                             | 1.3                             | 8         | 0                 | 0.106                     | -                  |
| 9/10/2002              | 1009           | Drain 4              | -                        | 10                          | 29                        | -             | 30.8                             | 8.6                             | 8.05      | 0                 | -                         | -                  |
| 9/10/2002              | 1005           | Drain 6              | -                        | 10                          | 29                        | -             | 30.6                             | 1.76                            | 1.76      | 0                 | -                         | -                  |
| 9/10/2002              | 959            | Drain 11             | -                        | <1                          | 28                        | -             | 30.3                             | 1.8                             | 1.8       | 0                 | -                         | -                  |
| 9/10/2002              | 946            | Drain 14             | -                        | <1                          | 29                        | -             | 29.9                             | 1.87                            | 1.87      | 0                 | -                         | -                  |
| 9/18/2002              | 953            | Drain 4              | -                        | >24192                      | 8                         | -             | 28.2                             | -                               | 8.1       | -                 | -                         | 7998               |
| 9/18/2002              | 1005           | Drain 6              | -                        | 24197                       | 19                        | -             | 29.2                             | -                               | 7.8       | -                 | -                         | 14995              |
| 9/18/2002              | 1017           | Drain 11             | -                        | >24192                      | 17                        | -             | 30                               | -                               | 8         | -                 | -                         | 13996              |
| 9/18/2002              | 1035           | Drain 14             | -                        | <1                          | 22                        | -             | 30.1                             | -                               | 8.1       | -                 | -                         | 16995              |
| 9/18/2002<br>9/18/2002 | 953            | Drain 4              | -                        | >24192<br>24197             | 8<br>19                   | -             | 28.2                             | -                               | 8.1       | -                 | -                         | 7998               |
| 9/18/2002              | 1005<br>1017   | Drain 6<br>Drain 11  | -                        | >24197                      | 17                        | -             | 29.2<br>30                       | -                               | 7.8<br>8  | -                 | -                         | 14995<br>13996     |
| 9/18/2002              | 1017           | Drain 14             | -                        | <1<br><1                    | 22                        | -             | 30.1                             |                                 | 8.1       | _                 |                           | 16995              |
| 9/25/2002              | -              | Drain 4              | _                        | 368                         | -                         | 26            | 30.5                             | 2.48                            | 8.03      | 0                 | 0.107                     | 17994              |
| 9/25/2002              | _              | Drain 6              | _                        | <1                          |                           | 28            | 30.8                             | 1.92                            | 8         | 0                 | 0.087                     | 18994              |
| 9/25/2002              | _              | Drain 11             | _                        | 10                          | -                         | 27            | 30.6                             | 1.53                            | 7.87      | 0                 | 0.064                     | 18994              |
| 9/25/2002              | -              | Drain 14             | _                        | <1                          | -                         | 29            | 29.2                             | 1.27                            | 8.12      | 0                 | 0.029                     | -                  |
| 10/2/2002              | 0946           | Drain 4              | -                        | <1                          | 18                        | -             | 31.2                             | 4.78                            | 7.6       | 0.61              | 0.414                     | 12996              |
| 10/2/2002              | 0941           | Drain 6              | -                        | <1                          | 27                        | -             | 31.2                             | 1.53                            | 7.77      | 0                 | 0.038                     | 18994              |
| 10/2/2002              | 0931           | Drain 11             | -                        | <1                          | 23                        | -             | 32.2                             | 1.36                            | 7.54      | 0                 | 0.225                     | 17495              |
| 10/2/2002              | 0922           | Drain 14             | -                        | <1                          | 32                        |               | 30.5                             | 1.79                            | 8.02      | 0                 | 0.056                     | 16994              |
| 10/7/2002              | 1032           | Drain 4              | -                        | -                           | -                         | -             | -                                | _                               | _         | 0                 | 1.879                     | 32                 |
| 10/7/2002              | 1044           | Drain 6              | -                        | -                           | -                         | -             | -                                | -                               | -         | 0                 | 0.218                     | 40                 |
| 10/7/2002              | 1052           | Drain 11             | -                        | -                           | -                         | -             | -                                | -                               | -         | 0                 | 0.47                      | 15                 |
| 10/9/2002              | 1017           | Drain 4              | -                        | 171                         | 27                        | -             | 29.9                             | 2.3                             | 7.7       | 0                 | 0.002                     | 18494              |
| 10/9/2002              | 1014           | Drain 6              | -                        | 52                          | 27                        | -             | 29.8                             | 2.88                            | 7.8       | 0                 | 0.022                     | 18494              |
| 10/9/2002              | 1009           | Drain 11             | -                        | 20                          | 28                        | -             | 30.4                             | 4.07                            | 7.7       | 0                 | 1.24                      | 18494              |
| 10/9/2002              | 0957           | Drain 14             | -                        | <1                          | 30                        | -             | 29.7                             | 1.67                            | 7.9       | 0                 | 0.441                     | 18494              |
| 10/15/2002             | 0940           | Drain 4              | -                        | 30                          | 20                        | -             | 30.9                             | 4.93                            | 7.6       | -                 | 0.025                     | 14496              |
| 10/15/2002             | 0935           | Drain 6              | -                        | <1                          | 27                        | -             | 30.6                             | 5.55                            | 7.8       | -                 | 0.009                     | 18494              |
| 10/15/2002             | 0930           | Drain 11             | -                        | 10                          | 29                        | -             | 30.9                             | 3.81                            | 7.6       | -                 | 0.079                     | 16995              |
| 10/15/2002             | 0916           | Drain 14             | -                        | <1                          | 29                        | -             | 29.2                             | 3.19                            | 7.8       | -                 | 0.034                     | 16495              |
| 10/23/2002             | 0959           | Drain 4              | -                        | <1                          | 27                        | -             | 31.1                             | 2.69                            | 7.8       | 0                 | 0.041                     | <del>-</del> -     |
| 10/23/2002             | 0955           | Drain 6              | -                        | <1                          | 28                        | -             | 31.2                             | 2.2                             | 7.9       | 0                 | 0.562                     | <del>-</del>       |
| 10/23/2002             | 0949           | Drain 11             | -                        | <1                          | 29                        | -             | 31.1                             | 1.32                            | 7.7       | 0                 | 0.027                     | <del>-</del>       |
| 10/23/2002             | 0940           | Drain 14             | -                        | <1                          | 28                        | -             | 31.3                             | 1.01                            | 7.9<br>8  | 0                 | 0.027                     | 12406              |
| 10/30/2002             | 0959<br>1004   | Drain 4              | -                        | <1<br>74                    | 30                        | -             | -                                | 1.4                             | 7.9       | 0                 | 0.027<br>0.02             | 12496<br>16495     |
| 10/30/2002             | 1004           | Drain 6<br>Drain 11  | -                        | /4<br><1                    | 30                        | -             | -                                | 2.5                             | 7.9       | 0                 | 0.02<br><b>0.031</b>      | 16495              |
| 10/30/2002             | 1009           | Drain 11<br>Drain 14 | -                        | <1<br><1                    | 30                        | -             | -                                | 1.3                             | 8.2       | 0                 | 0.005                     | 17495              |
| 11/6/2002              | 1020           | Drain 14 Drain 4     | -                        | 20                          | 30                        | -             | -                                | 2.9                             | 8.2       | 0                 | 2.72                      | 17495              |
| 11/6/2002              | 1048           | Drain 4 Drain 6      | _                        | 121                         | 31                        | -             | -                                | 2.9                             | 8.1       | 0                 | 0.092                     | 19494              |
| 11/6/2002              | 1052           | Drain 6 Drain 11     | -                        | <1                          | 29                        | _             | -                                | 1.6                             | 8.1       | 0.29              | 0.092                     | 19494              |
| 11/6/2002              | 1056           | Drain 11 Drain 14    | -                        | <1                          | 30                        | -             | -                                | 2                               | 8.1       | 0.29              | 1.019                     | 19494              |
| 11/6/2002              | 1002           | Drain 14 Drain 4     | <del>-</del>             | <1                          | 22                        | _             | _                                | 3.21                            | 7.8       | 0.25              | 0.009                     | 13996              |
| 11/13/2002             |                | 4 וווגוע             |                          |                             |                           |               | -                                | 3.52                            | 8         | 0                 | 0.009                     | 18494              |
| 11/13/2002             |                | Drain 6              | _                        | /1                          | , ,                       |               |                                  |                                 |           |                   |                           |                    |
|                        | 0958           | Drain 6              | -                        | <1                          | 27<br>27                  | -             |                                  |                                 |           |                   |                           | 1                  |
| 11/13/2002             | 0958<br>0953   | Drain 11             | -                        | <1                          | 27                        | -             | -                                | 1.41                            | 7.8       | 0                 | 0.022                     | 18494              |
|                        | 0958           |                      |                          |                             |                           |               |                                  |                                 |           |                   |                           | 1                  |

Table C.21: Lagoon Water Quality Results, 2002-2003

|                        |                  |                      | Fecal                    | <b>.</b>                    | Calinity                  | Dissolved     | Tomporeture                      | Tumbidity                       |           | <b>3</b> 74.      | DO.                       | GILL 11            |
|------------------------|------------------|----------------------|--------------------------|-----------------------------|---------------------------|---------------|----------------------------------|---------------------------------|-----------|-------------------|---------------------------|--------------------|
| Date                   | Time             | Site                 | Coliform<br>(CFU/100 ml) | Enterococci<br>(CFU/100 ml) | Salinity (‰) <sup>2</sup> | Oxygen<br>(%) | Temperature<br>(°C) <sup>2</sup> | Turbidity<br>(NTU) <sup>2</sup> | рH        | Nitrate<br>(mg/L) | PO <sub>4</sub><br>(mg/L) | Chloride<br>(mg/L) |
| Date                   | Time             | Site                 | GM <sup>1</sup> <200,    | ,                           | (700)                     | (70)          | ( C)                             | (1110)                          | hii       | (IIIg/L)          | (IIIg/L)                  | (IIIg/L)           |
| CNMI W                 | ater Quality S   | tandards             | <400 Single              | $GM^1 < 35, < 104$          | 10                        | >75           | 1.0                              | 0.5                             | 7.6 - 8.6 | < 0.2             | < 0.025                   | NA                 |
|                        | atter Quartity S | turiour ob           | Sample*                  | Single Sample <sup>*</sup>  | 10                        | 1 770         | 1.0                              | 0.0                             | 7.0 0.0   | 10.2              | 10.020                    | 1,11               |
| 11/20/2002             | 1110             | Drain 6              | -                        | >2419.2                     | 25                        | _             | _                                | -                               | 7.9       | 0                 | 0.107                     | _                  |
| 11/20/2002             | 1116             | Drain 11             | _                        | >2419.2                     | 23                        | _             | _                                | _                               | 7.9       | 0                 | 0.125                     | _                  |
| 11/20/2002             | 0848             | Drain 14             | _                        | 2046                        | 31                        | -             | _                                | 3.47                            | 8.1       | 0                 | 0.275                     | -                  |
| 11/26/2002             | 1057             | Drain 4              | _                        | 20                          | -                         | -             | -                                | 1.8                             | 8.1       | 0                 | 0.129                     | 18994              |
| 11/26/2002             | 1103             | Drain 6              | -                        | 10                          | -                         | -             | -                                | 1.5                             | 8.1       | 0                 | 0.332                     | 18994              |
| 11/26/2002             | 1108             | Drain 11             | -                        | 30                          | -                         | -             | -                                | 0.94                            | 8.1       | 0                 | 0.117                     | 18994              |
| 11/26/2002             | 0910             | Drain 14             | -                        | <1                          | -                         | -             | -                                | -                               | 8.1       | 0                 | 0.089                     | 19994              |
| 12/4/2002              | 1053             | Drain 4              | -                        | 10                          | 31                        | -             | -                                | -                               | -         | 0                 | 0.042                     | 18994              |
| 12/4/2002              | 1058             | Drain 6              | -                        | <1                          | 31                        | -             | -                                | -                               | 1         | 0                 | 0.067                     | 18494              |
| 12/4/2002              | 1104             | Drain 11             | -                        | <1                          | 30                        | -             | -                                | -                               | 1         | 0                 | 0.095                     | 18994              |
| 12/4/2002              | 0837             | Drain 14             | -                        | 10                          | 32                        | -             | -                                | 1.05                            | 8         | 0                 | 0.074                     | 23493              |
| 12/4/2002              | -                | Drain 4              | -                        | >2419.2                     | -                         | -             | -                                | -                               | -         | 0                 | 0.497                     | -                  |
| 12/4/2002              | -                | Drain 6              | -                        | 19862.8                     |                           | -             | -                                | -                               |           | 0                 | 0.073                     |                    |
| 12/10/2002             | 1102             | Drain 4              | -                        | 63                          | -                         | -             | -                                | 2                               | 8         | 0                 | 0.018                     | 17994              |
| 12/10/2002             | 1109             | Drain 6              |                          | 54                          | -                         |               | -                                | 2.1                             | 8         | 0                 | 0.02                      | 18994              |
| 12/10/2002             | 1114             | Drain 11             | -                        | 86                          | -                         | -             | -                                | 1.8                             | 8.1       | 0                 | 0.008                     | 19494              |
| 12/10/2002             | 1034             | Drain 14             | -                        | 41                          | 35                        | -             | 27.6                             | 2.44                            | 8.2       | 0                 | 0.025                     | 18494              |
| 12/18/2002             | 1057             | Drain 4              | -                        | 160                         | 30                        | -             | -                                | -                               | 8         | 0                 | 0.057                     | 18494              |
| 12/18/2002             | 1104             | Drain 6              | -                        | 20                          | 30                        | -             | -                                | -                               | 8         | 0                 | 0.035                     | 18494              |
| 12/18/2002             | 1110             | Drain 11             | -                        | <1                          | 30                        | -             | -                                | -                               | 7.8       | 0                 | 0.01                      | 18494              |
| 12/18/2002             | 1035             | Drain 14             | -                        | <1                          | 30                        | -             | -                                | 1.56                            | 8.2       | 0                 | 0.017                     | 19994              |
| 12/23/2002             | 0927             | Drain 4              | -                        | 20                          | 30                        | -             | -                                | 1.62                            | 7.7       | 0                 | 0.058                     | 16495              |
| 12/23/2002             | 0915             | Drain 6              | -                        | 10                          | 29                        | -             | -                                | 1.57                            | 7.8       | 0                 | 0.067                     | 18994              |
| 12/23/2002             | 0910             | Drain 11             | -                        | <1                          | 30                        | -             | -                                | 1.1                             | 7.7       | 0                 | 0.064                     | 19994              |
| 12/23/2002             | 1112             | Drain 14             | -                        | 20                          | 31                        | -             | 29.1                             | 1.94                            | 8.1       | 0                 | 0.051                     | 18994              |
| 12/30/2002             | 0912             | Drain 4              | -                        | 31                          | 29                        | -             | -                                | 1.88                            | 7.9       | 0                 | 0.031                     | 19494              |
| 12/30/2002             | 0906             | Drain 6              | -                        | <1                          | 33                        | -             | -                                | 1.41                            | 7.9       | 0                 | 0.025                     | 19994              |
| 12/30/2002             | 0900             | Drain 11             | -                        | 110                         | 29                        | -             | -                                | 8.14                            | 8         | 0                 | 0.039                     | 17994              |
| 12/30/2002             | 0840             | Drain 14             | -                        | 41                          | 30                        | -             | 26.3                             | 1.95                            | 8.1       | 0                 | 0.03                      | 16495              |
| 1/7/2003               | 1133             | Drain 4              | -                        | 226                         | 30                        | -             | -                                | 3.72                            | 8.1       | 0                 | 0.015                     | 18994              |
| 1/7/2003               | 1137             | Drain 6              | -                        | 226                         | 30                        | -             | -                                | 5.76                            | 8.2       | 0                 | 0.009                     | 15495              |
| 1/7/2003               | 1143             | Drain 11             | -                        | 985                         | 30                        | -             | -                                | 2.98                            | 8.3       | 0                 | 0.009                     | 15995              |
| 1/7/2003               | 1152             | Drain 14             | -                        | <1                          | 30                        | -             | -                                | 3.46                            | 8.3       | 0                 | 0.011                     | 18494              |
| 1/15/2003              | 1025             | Drain 4              | -                        | 97                          | 30                        | -             | 28.5                             | 1.1                             | 7.9       | 0                 | 0.082                     | 18494              |
| 1/15/2003              | 1031             | Drain 6              | -                        | <1                          | 30                        | -             | 28                               | 2.3                             | 8.1       | 0                 | 0.129                     | 19994              |
| 1/15/2003              | 1037             | Drain 11             | -                        | 10                          | 30                        | -             | 28.8                             | 1.2                             | 8         | 0                 | 0.114                     | 19994              |
| 1/15/2003              | 1043             | Drain 14             | -                        | <1                          | 30                        | -             | 28.6                             | 1.6                             | 8.2       | 0                 | 0.037                     | 18994              |
| 1/22/2003              | 1024             | Drain 4              | -                        | <1                          | 30                        | -             | 28.5                             | 1.9                             | 7         | 0                 | 0.033                     | -                  |
| 1/22/2003              | 1030             | Drain 6              | -                        | 41                          | 30                        | -             | 27.3                             | 2.5                             | 7.9       | 0                 | 0.035                     | -                  |
| 1/22/2003              | 1037             | Drain 11             | -                        | 10                          | 30                        | -             | 28.1                             | 1.9                             | 7.8       | 0                 | 0.029                     | -                  |
| 1/22/2003              | 1043             | Drain 14             | -                        | 10                          | 30                        | -             | 27.1                             | 6.2                             | 8.1       | 0                 | 0.053                     | 17004              |
| 1/29/2003              | 1027             | Drain 4              | -                        | 41                          | 30                        | -             | 28                               | 2.2                             | 8         | 0                 | 0.017                     | 17994              |
| 1/29/2003<br>1/29/2003 | 1033<br>1038     | Drain 6<br>Drain 11  | -                        | 20<br>20                    | 30                        | -             | 28.1                             | 2.8<br>3.2                      | 8         | 0                 | 0.013                     | 17994              |
| 1/29/2003              | 1058             |                      | -                        | 20                          | 30                        | -             | 27.6<br>27                       |                                 | 8         | 0                 | 0.027                     | 18994              |
| 2/5/2003               | 0855             | Drain 14<br>Drain 4  | -                        | 4352                        | 30                        | -             | 29.3                             | 2.9                             | 8<br>7.7  | 0                 | 0.01                      | 18994              |
| 2/5/2003               | 0900             | Drain 4 Drain 6      | -                        | 4352<br>798                 | 30                        | -             | 29.3                             | 9.4                             | 7.7       | 0                 | -                         | -                  |
| 2/5/2003               | 0900             | Drain 6 Drain 11     | -                        | 335                         | 30                        | -             | 28.8                             |                                 | 7.9       | 0                 | -                         | -                  |
| 2/5/2003               | 0905             | Drain 11<br>Drain 14 | -                        | 231                         | 30                        | -             | 28.8                             | 1.6<br>1.2                      | 8.1       | 0                 | -                         | -                  |
| 1                      |                  |                      | r a 30-dav perio         |                             | 30                        |               | 21.3                             | 1.2                             | 0.1       | U                 |                           |                    |

**Bold** values exceed CNMI water quality standards.

Grey-shaded values exceed 2.5, a non-regulatory assigned value for coastal waters to approximate ambient conditions in a healthy reef system.

<sup>&</sup>lt;sup>1</sup> GM in not less than four samples over a 30-day period. <sup>2</sup> Shall not exceed ambient by more than the stated value.

<sup>\*</sup> For the purpose of this study, analytical results were compared against the single sample standard.

<sup>- =</sup> data not available

<sup>% =</sup> percent

<sup>‰ =</sup> per mil (parts per thousand)

<sup>°</sup>C = degrees Celsius

GM = geometric mean

CFU = colony forming units

mg/L = milligrams per liter

ml = milliliter

NA = not applicable

ND = not detected

 $NTU = nephelometric \ turbidity \ units$ 

 $PO_4$  = orthophosphate

Table C.22: Average Values of Lagoon Water Quality Results, Wet versus Dry Season, 2002-2003

| Location     | Enterococci<br>(CFU/100 ml) | Salinity<br>(‰) | Dissolved<br>Oxygen<br>(%) | Temperature (°C) | Turbidity<br>(NTU) | pН   | Nitrate<br>(mg/L) | PO <sub>4</sub> (mg/L) | Chloride<br>(mg/L) |
|--------------|-----------------------------|-----------------|----------------------------|------------------|--------------------|------|-------------------|------------------------|--------------------|
| Drain 4 Wet  | 9186.5                      | 22.6            | 52.7                       | 29.8             | 63.1               | 7.98 | 0.07              | 0.76                   | 14344.2            |
| Drain 4 Dry  | 310                         | 30.5            | 99.1                       | 29.2             | 13.5               | 7.96 | 0.02              | 0.08                   | 18829.1            |
| Drain 6 Wet  | 17614.9                     | 26.3            | 62.8                       | 29.8             | 15.8               | 7.7  | 0.02              | 0.25                   | 17033.2            |
| Drain 6 Dry  | 852.5                       | 31.1            | 99.3                       | 28.9             | 8.6                | 8.02 | 0                 | 0.07                   | 20472.1            |
| Drain 11 Wet | 423.3                       | 24.8            | 50.8                       | 30.1             | 25.5               | 7.68 | 0.04              | 0.44                   | 16781.5            |
| Drain 11 Dry | 87.3                        | 30.9            | 94.3                       | 29.2             | 3.2                | 7.99 | 0                 | 0.04                   | 19044.1            |
| Drain 14 Wet | 3712.4                      | 27.6            | 53.3                       | 29.8             | 6.7                | 7.8  | 0.03              | 0.17                   | 18452.6            |
| Drain 14 Dry | 31.6                        | 31.2            | 102.9                      | 28.6             | 8.3                | 8.11 | 0                 | 0.05                   | 19139.9            |

<sup>% =</sup> percent

% = per mil (part per thousand)

°C = degrees Celsius

CFU = colony forming units

mg/L = milligrams per liter

ml = milliliter

NTU = nephelometric turbidity units

 $PO_4$  = orthophosphate

Table C.23: Lagoon Water Quality Results, 2010-2011

| Date                   | Time            | Site         | Fecal<br>Coliform<br>(CFU/100 ml)                           | Enterococci<br>(CFU/100 ml) | Enterococci<br>(CFU/100 ml)<br>/GM <sup>1</sup> | Salinity (‰) <sup>2</sup> | Dissolved<br>Oxygen<br>(%) | Temperature (°C) <sup>2</sup> | Turbidity (NTU) <sup>2</sup> | рН         |
|------------------------|-----------------|--------------|-------------------------------------------------------------|-----------------------------|-------------------------------------------------|---------------------------|----------------------------|-------------------------------|------------------------------|------------|
| CNMI W                 | Vater Quality S | Standards    | GM <sup>1</sup> <200,<br><400 Single<br>Sample <sup>*</sup> | <104                        | <35                                             | 10                        | >75                        | 1.0                           | 0.5                          | 7.6 - 8.6  |
| 7/8/2010               | 0906            | 21.0         | -                                                           | 73                          | 73                                              | 33.0                      | 118.9                      | 28.5                          | 7.4                          | 8.1        |
| 7/8/2010               | 0917            | 22.0         | -                                                           | 201                         | 21                                              | 34.1                      | 96.8                       | 29.3                          | 3.6                          | 8.1        |
| 7/8/2010               | 0913            | 23.0         | -                                                           | 10                          | 10                                              | 33.8                      | 103.1                      | 29.1                          | 2.9                          | 8.1        |
| 7/8/2010               | 0928            | 24.0         | -                                                           | 20                          | 14                                              | 34.2                      | 90.8                       | 29.4                          | 1.3                          | 8          |
| 7/14/2010              | 0848            | 21.0         | -                                                           | 86                          | 86                                              | 35.6                      | 74.0                       | 29.9                          | 5.8                          | 8          |
| 7/14/2010              | 0855            | 22.0         | -                                                           | 20                          | 25                                              | 35.6                      | 83.3                       | -                             | 1.7                          | 8.1        |
| 7/14/2010              | 0852            | 23.0         | -                                                           | 10                          | 10                                              | 34.8                      | 84.2                       | 30.2                          | 2.2                          | 8.1        |
| 7/14/2010              | 0943            | 24.0         | -                                                           | 10                          | 14                                              | 35.2                      | 79.8                       | 31.2                          | 4                            | 8.1        |
| 7/22/2010              | 1142            | 21.0         | -                                                           | 906                         | 131                                             | 35.3                      | 68.2                       | 31.4                          | 7.6                          | 8.1        |
| 7/22/2010              | 1132            | 22.0         | -                                                           | 41                          | 36                                              | 31.8                      | 110.0                      | 33.0                          | 2.1                          | 8.1        |
| 7/22/2010              | 1134            | 23.0         | -                                                           | 10                          | 12                                              | 35.2                      | 150.6                      | 33.4                          | 2.4                          | 8.4        |
| 7/22/2010<br>7/27/2010 | 1127<br>0850    | 24.0<br>21.0 | -                                                           | 30<br>41                    | 19<br><b>124</b>                                | 34.3<br>33.4              | 98.9<br>86.9               | 35.9<br>28.6                  | 3.3                          | 8.1<br>8.1 |
| 7/27/2010              | 0905            | 22.0         | -                                                           | 20                          | 43                                              | 33.8                      | 88.9                       | 28.8                          | 1                            | 8          |
| 7/27/2010              | 0855            | 23.0         | _                                                           | 75                          | 17                                              | 33.8                      | 90.4                       | 28.1                          | 2.5                          | 8.1        |
| 7/27/2010              | 0915            | 24.0         | _                                                           | 10                          | 16                                              | 33.9                      | 89.4                       | 28.4                          | 1                            | 8.1        |
| 8/3/2010               | 0850            | 21.0         | _                                                           | 209                         | 161                                             | 35.6                      | 71.7                       | 30.0                          | 4.8                          | 7.9        |
| 8/3/2010               | 0902            | 22.0         | _                                                           | 10                          | 20                                              | 35.9                      | 69.3                       | 30.8                          | 2.3                          | 7.8        |
| 8/3/2010               | 0855            | 23.0         | _                                                           | 10                          | 17                                              | 33.5                      | 81.4                       | 30.4                          | 1.6                          | 7.8        |
| 8/3/2010               | 0912            | 24.0         | -                                                           | 10                          | 13                                              | 34.9                      | 52.9                       | 32.2                          | 1.4                          | 7.8        |
| 8/11/2010              | 0903            | 21.0         | -                                                           | 31                          | 125                                             | 32.3                      | 110.6                      | 28.9                          | 5.5                          | 7.8        |
| 8/11/2010              | 0924            | 22.0         | -                                                           | 31                          | 22                                              | 34.9                      | 94.3                       | 30.4                          | 2.6                          | 8          |
| 8/11/2010              | 0919            | 23.0         | -                                                           | 52                          | 25                                              | 33.9                      | 99.8                       | 30.6                          | 3.4                          | 8          |
| 8/11/2010              | 0936            | 24.0         | -                                                           | 10                          | 13                                              | 34.5                      | 94.7                       | 30.3                          | 2.1                          | 8          |
| 8/18/2010              | 0824            | 21.0         | -                                                           | 74                          | 67                                              | 32.6                      | 60.1                       | 30.2                          | 7.1                          | 8          |
| 8/18/2010              | 0837            | 22.0         | -                                                           | 10                          | 16                                              | 32.0                      | 80.2                       | 31.0                          | 2                            | 8          |
| 8/18/2010              | 0831            | 23.0         | -                                                           | 31                          | 33                                              | 29.6                      | 45.5                       | 30.6                          | 1.9                          | 7.7        |
| 8/18/2010              | 0844            | 24.0         | -                                                           | 10                          | 10                                              | 30.1                      | 43.7                       | 33.1                          | 2                            | 7.7        |
| 8/25/2010              | 1126            | 21.0         | -                                                           | 226                         | 102                                             | 32.6                      | 86.1                       | 30.8                          | 6.3                          | 7.8        |
| 8/25/2010              | 1114            | 22.0         | -                                                           | 199                         | 28                                              | 33.6                      | 94.4                       | 30.6                          | 2                            | 8          |
| 8/25/2010              | 1119            | 23.0         | -                                                           | 135                         | 38                                              | 34.0                      | 88.9                       | 30.9                          | 1.9                          | 8.1        |
| 8/25/2010              | 1106            | 24.0         | -                                                           | 41                          | 14                                              | 34.1                      | 91.3                       | 30.7                          | 1.1                          | 8.1        |
| 9/1/2010               | 1012            | 21.0         | -                                                           | 10                          | 48                                              | 33.0                      | 79.3                       | 30.4                          | 7.5                          | 7.8        |
| 9/1/2010               | 0959            | 22.0         | -                                                           | 61                          | 44                                              | 33.6                      | 87.8                       | 30.1                          | 2.6                          | 8          |
| 9/1/2010<br>9/1/2010   | 1004<br>0954    | 23.0<br>24.0 | -                                                           | 84<br>10                    | <b>65</b><br>14                                 | 32.8<br>34.4              | 91.3<br>93.1               | 30.2<br>30.2                  | 3.9<br>1.3                   | 8          |
| 9/1/2010               | 0954            | 21.0         |                                                             | 85                          | 61                                              | 29.9                      | 104.6                      | 29.7                          | 4.9                          | 7.8        |
| 9/8/2010               | 0911            | 22.0         |                                                             | 160                         | 66                                              | 33.8                      | 96.3                       | 29.9                          | 2.4                          | 8          |
| 9/8/2010               | 0904            | 23.0         |                                                             | 393                         | 108                                             | 31.6                      | 99.8                       | 29.7                          | 3.3                          | 8          |
| 9/8/2010               | 0917            | 24.0         | _                                                           | 20                          | 17                                              | 34.0                      | 100.6                      | 29.6                          | 1.6                          | 8.1        |
| 9/15/2010              | 0837            | 21.0         | _                                                           | 52                          | 56                                              | 33.3                      | 63.8                       | 30.7                          | 2.6                          | 8          |
| 9/15/2010              | 0857            | 22.0         | -                                                           | 10                          | 66                                              | 30.3                      | 75.6                       | 30.9                          | 1.2                          | 7.9        |
| 9/15/2010              | 0845            | 23.0         | -                                                           | 10                          | 82                                              | 12.8                      | 61.3                       | 29.4                          | 2.2                          | 7.9        |
| 9/15/2010              | 0902            | 24.0         | -                                                           | 10                          | 17                                              | 30.8                      | 57.2                       | 33.2                          | 2.2                          | 7.7        |
| 9/22/2010              | 1043            | 21.0         | -                                                           | 6131                        | 128                                             | 33.4                      | 79.4                       | 28.8                          | 7.4                          | 8.1        |
| 9/22/2010              | 1024            | 22.0         | -                                                           | 41                          | 45                                              | 33.6                      | 86.1                       | 28.8                          | 3.6                          | 8.2        |
| 9/22/2010              | 1033            | 23.0         | -                                                           | 2382                        | 167                                             | 33.9                      | 85.3                       | 28.7                          | 6.9                          | 8.2        |
| 9/22/2010              | 1017            | 24.0         | -                                                           | 62                          | 19                                              | 33.4                      | 84.4                       | 28.7                          | 2.3                          | 8          |
| 9/29/2010              | 0855            | 21.0         | -                                                           | 295                         | 299                                             | 33.4                      | 89.9                       | 28.7                          | 3.6                          | 8.1        |
| 9/29/2010              | 0910            | 22.0         | -                                                           | 52                          | 43                                              | 33.6                      | 94.6                       | 28.6                          | 2.6                          | 8          |
| 9/29/2010              | 0900            | 23.0         | -                                                           | 160                         | 197                                             | 33.4                      | 89.9                       | 28.4                          | 3                            | 8.1        |
| 9/29/2010              | 0920            | 24.0         | -                                                           | 10                          | 19<br>175                                       | 33.8                      | 91.9                       | 28.6                          | 2.5                          | 8          |
| 10/6/2010<br>10/6/2010 | 0948<br>1012    | 21.0<br>22.0 | -                                                           | 10<br>10                    | 175<br>21                                       | 33.5<br>31.2              | <b>72.8</b> 85.5           | 30.5<br>30.6                  | 6.1<br>2.8                   | 7.9<br>7.8 |
| 10/6/2010              | 1012            | 23.0         | -                                                           | 10<br><b>109</b>            | 143                                             | 26.2                      | 85.5<br>104.2              | 30.6                          | 1.8                          | 7.8        |
| 10/6/2010              | 1009            | 24.0         | _                                                           | 109                         | 16                                              | 26.2                      | 67.2                       | 33.3                          | 1.8                          | 7.8        |
| 10/0/2010              | 0818            | 21.0         | -                                                           | 9804                        | 649                                             | 32.4                      | 76.2                       | 30.4                          | 6.2                          | 7.9        |
| 10/13/2010             | 0828            | 22.0         | -                                                           | 22                          | 26                                              | 34.0                      | 81.0                       | 30.5                          | 2.4                          | 7.9        |
| 10/13/2010             | 0824            | 23.0         | -                                                           | 10                          | 143                                             | 33.6                      | 80.5                       | 30.2                          | 3                            | 7.9        |
| 10/13/2010             | 0835            | 24.0         | -                                                           | 10                          | 16                                              | 32.0                      | 75.6                       | 31.3                          | 4.7                          | 7.9        |
| 10/20/2010             | 0906            | 21.0         | -                                                           | 2046                        | 493                                             | 31.3                      | 104.9                      | 28.5                          | 6.3                          | 8.2        |
| 10/20/2010             | 0919            | 22.0         | -                                                           | 10                          | 18                                              | 33.8                      | 99.3                       | 28.8                          | 2.9                          | 8.1        |
| 10/20/2010             | 0913            | 23.0         | -                                                           | 97                          | 64                                              | 32.4                      | 89.4                       | 28.7                          | 4.8                          | 8.1        |
| 10/20/2010             | 0926            | 24.0         | -                                                           | 10                          | 10                                              | 33.9                      | 103.9                      | 28.8                          | 1.9                          | 8          |
| 10/27/2010             | 0936            | 21.0         | -                                                           | 275                         | 485                                             | 33.1                      | 94.9                       | 29.6                          | 2.1                          | 7.9        |
| 10/27/2010             | 0948            | 22.0         | -                                                           | 31                          | 16                                              | 31.8                      | 118.3                      | 29.7                          | 1                            | 7.9        |
| 10/27/2010             | 0940            | 23.0         | -                                                           | 10                          | 32                                              | 33.4                      | 104.6                      | 29.6                          | 1.9                          | 7.9        |
| 10/27/2010             | 1005            | 24.0         | -                                                           | 10                          | 10                                              | 32.7                      | 103.9                      | 29.8                          | 0.75                         | 7.9        |
| 11/2/2010              | 1042            | 21.0         | -                                                           | 10                          | 485                                             | 34.3                      | 86.9                       | 29.8                          | 3.6                          | 8          |
| 11/2/2010              | 1032            | 22.0         | -                                                           | 10                          | 16                                              | 34.4                      | 85.4                       | 29.8                          | 3.2                          | 7.9        |
| 11/2/2010              | 1034            | 23.0         | -                                                           | 10                          | 18                                              | 34.4                      | 92.9                       | 28.7                          | 1.9                          | 8          |
| 11/2/2010<br>11/9/2010 | 1030<br>0925    | 24.0<br>21.0 | -                                                           | 10<br><b>193</b>            | 10<br><b>182</b>                                | 34.6<br>34.0              | 96.3<br><b>34.5</b>        | 29.8<br>29.7                  | 1.4                          | 8.1        |
| 11/9/2010              | 0925            | 22.0         | <del>-</del>                                                | 193                         | 182                                             | 33.0                      | 33.8                       | 29.7                          | 2                            | 8.1        |
| 11/9/2010              | 1932            | 23.0         | -                                                           | 20                          | 21                                              | 33.0                      | 33.9                       | 29.6                          | 3.5                          | 8.1        |
| 11/9/2010              | 0958            | 24.0         | _                                                           | 10                          | 10                                              | 34.0                      | 34.1                       | 29.8                          | 2                            | 8          |
| 11/7/2010              | 0850            | 21.0         | -                                                           | 10                          | 48                                              | 34.0                      | 99.6                       | 28.6                          | 3                            | 8.1        |
| 11/17/2010             | 0905            | 22.0         | _                                                           | 10                          | 13                                              | 34.0                      | 89.4                       | 28.4                          | 2.6                          | 8.1        |
| 11/17/2010             | 0856            | 23.0         | -                                                           | 10                          | 12                                              | 34.0                      | 94.6                       | 28.9                          | 4                            | 8.1        |
| 11/17/2010             | 0920            | 24.0         | -                                                           | 10                          | 10                                              | 34.0                      | 89.6                       | 28.7                          | 2                            | 8          |
| 11/23/2010             | 0850            | 21.0         | -                                                           | 213                         | 45                                              | 34.0                      | 88.9                       | 29.6                          | 6.6                          | 8.1        |
| 11/23/2010             | 0858            | 22.0         | -                                                           | 97                          | 18                                              | 34.0                      | 90.4                       | 29.6                          | 2.6                          | 8          |
| 11/23/2010             | 0855            | 23.0         | -                                                           | 327                         | 28                                              | 34.0                      | 94.6                       | 29.8                          | 3                            | 8.1        |
|                        |                 | -            | _                                                           | -                           | _                                               |                           |                            |                               |                              |            |

Table C.23: Lagoon Water Quality Results, 2010-2011

| Date                     | Time           | Site         | Fecal<br>Coliform<br>(CFU/100 ml)    | Enterococci<br>(CFU/100 ml) | Enterococci<br>(CFU/100 ml)<br>/GM <sup>1</sup> | Salinity (‰) <sup>2</sup> | Dissolved<br>Oxygen<br>(%) | Temperature (°C) <sup>2</sup> | Turbidity (NTU) <sup>2</sup> | рН         |
|--------------------------|----------------|--------------|--------------------------------------|-----------------------------|-------------------------------------------------|---------------------------|----------------------------|-------------------------------|------------------------------|------------|
|                          | ater Quality S |              | GM <sup>1</sup> <200,<br><400 Single | <104                        | <35                                             | 10                        | >75                        | 1.0                           | 0.5                          | 7.6 - 8.6  |
| 11/23/2010               | 0905           | 24.0         | Sample <sup>*</sup>                  | 10                          | 10                                              | 34.0                      | 86.7                       | 28.6                          | 2.5                          | 8          |
| 12/1/2010                | 0827           | 21.0         | _                                    | 41                          | 64                                              | 32.0                      | 71.0                       | 28.8                          | 6.8                          | 7.9        |
| 12/1/2010                | 0840           | 22.0         | _                                    | 10                          | 18                                              | 34.0                      | 74.6                       | 29.2                          | 1.5                          | 7.9        |
| 12/1/2010                | 0832           | 23.0         | _                                    | 10                          | 28                                              | 32.0                      | 97.3                       | 29.3                          | 1.1                          | 7.9        |
| 12/1/2010                | 0846           | 24.0         | -                                    | 10                          | 10                                              | 32.0                      | 65.7                       | 30.0                          | 2.1                          | 7.9        |
| 12/6/2010                | 0855           | 21.0         | -                                    | 85                          | 52                                              | 34.0                      | 89.9                       | 28.3                          | 5                            | 7.9        |
| 12/6/2010                | 0910           | 22.0         | -                                    | 61                          | 28                                              | 34.0                      | 88.4                       | 28.8                          | 4                            | 8          |
| 12/6/2010                | 0900           | 23.0         | -                                    | 862                         | 73                                              | 34.0                      | 90.9                       | 28.6                          | 4.5                          | 8.1        |
| 12/6/2010                | 0915           | 24.0         | -                                    | 20                          | 12                                              | 33.0                      | 89.4                       | 28.8                          | 2.5                          | 8          |
| 12/15/2010               | 0842           | 21.0         | -                                    | 20                          | 62                                              | 26.0                      | 63.9                       | 28.7                          | 4.1                          | 7.9        |
| 12/15/2010               | 0846           | 22.0         | -                                    | 10                          | 28                                              | 29.0                      | 97.9                       | 29.3                          | 2.4                          | 7.8        |
| 12/15/2010               | 0851           | 23.0         | -                                    | 10                          | 73                                              | 29.0                      | 42.0                       | 29.1                          | 1.4                          | 7.7        |
| 12/15/2010<br>12/22/2010 | 0859<br>0856   | 24.0<br>21.0 | -                                    | 10<br><b>31</b>             | 12<br><b>38</b>                                 | 31.0<br>33.0              | <b>45.5</b><br>84.2        | 29.8<br>28.0                  | 2.1                          | 7.7<br>8.1 |
| 12/22/2010               | 0836           | 22.0         | -                                    | 259                         | 35                                              | 35.0                      | 81.0                       | 28.8                          | 1.1                          | 8.1        |
| 12/22/2010               | 0905           | 23.0         |                                      | 613                         | 85                                              | 33.0                      | 76.1                       | 28.6                          | 2.2                          | 8.1        |
| 12/22/2010               | 0919           | 24.0         | _                                    | 10                          | 12                                              | 34.0                      | 86.4                       | 28.9                          | 0.96                         | 8.1        |
| 12/29/2010               | 0915           | 21.0         | _                                    | 417                         | 68                                              | 32.0                      | 106.5                      | 28.3                          | 3.5                          | 7.6        |
| 12/29/2010               | 0925           | 22.0         | -                                    | 10                          | 35                                              | 35.0                      | 88.6                       | 28.4                          | 2.6                          | 8.1        |
| 12/29/2010               | 0920           | 23.0         | -                                    | 20                          | 101                                             | 33.0                      | 98.6                       | 28.7                          | 3.6                          | 8.1        |
| 12/29/2010               | 0934           | 24.0         | -                                    | 20                          | 14                                              | 34.0                      | 99.7                       | 28.6                          | 2.6                          | 8          |
| 1/5/2011                 | 1121           | 21.0         | -                                    | 292                         | 93                                              | -                         | -                          | -                             | -                            | -          |
| 1/5/2011                 | 1125           | 22.0         | -                                    | 428                         | 58                                              | -                         | -                          | -                             | -                            | -          |
| 1/5/2011                 | 1127           | 23.0         | -                                    | 231                         | 73                                              | -                         | -                          | -                             | -                            | -          |
| 1/5/2011                 | 1131           | 24.0         | -                                    | 52                          | 18                                              | - 22 :                    | -                          | -                             | -                            | -          |
| 1/12/2011                | 0908           | 21.0         | -                                    | 97                          | 138                                             | 32.1                      | 67.5                       | 28.7                          | 3.4                          | 8          |
| 1/12/2011                | 0913           | 22.0         | -                                    | 74                          | 95<br>72                                        | 31.3                      | 77.8                       | 29.0                          | 2                            | 7.6        |
| 1/12/2011<br>1/12/2011   | 0919<br>0925   | 23.0<br>24.0 | -                                    | 10<br>10                    | <b>73</b>                                       | 32.0<br>33.4              | 74.9<br>54.6               | 29.0<br>29.6                  | 3.9                          | 7.9<br>7.9 |
| 1/12/2011                | 0850           | 21.0         | _                                    | 309                         | 162                                             | 33.8                      | 89.9                       | 29.6                          | 3.9                          | 8.1        |
| 1/19/2011                | 0900           | 22.0         | <u> </u>                             | 86                          | 93                                              | 33.8                      | 94.8                       | 29.8                          | 2.6                          | 8.1        |
| 1/19/2011                | 0855           | 23.0         | _                                    | 295                         | 96                                              | 33.8                      | 96.9                       | 28.9                          | 4                            | 8.1        |
| 1/19/2011                | 0910           | 24.0         | _                                    | 75                          | 24                                              | 33.4                      | 84.9                       | 29.8                          | 2.5                          | 8          |
| 1/26/2011                | 0841           | 21.0         | -                                    | 122                         | 214                                             | 33.5                      | 89.7                       | 28.8                          | 3                            | 8.1        |
| 1/26/2011                | 0855           | 22.0         | -                                    | 41                          | 65                                              | 34.6                      | 91.6                       | 28.8                          | 2                            | 8.1        |
| 1/26/2011                | 0850           | 23.0         | -                                    | 30                          | 53                                              | 34.7                      | 96.6                       | 28.8                          | 3.5                          | 8.1        |
| 1/26/2011                | 0905           | 24.0         | -                                    | 20                          | 27                                              | 34.6                      | 89.9                       | 28.4                          | 2                            | 8          |
| 2/2/2011                 | 0828           | 21.0         | -                                    | 148                         | 174                                             | 33.9                      | 72.9                       | 27.7                          | 7.9                          | 7.9        |
| 2/2/2011                 | 0838           | 22.0         | -                                    | 98                          | 102                                             | 33.6                      | 80.9                       | 27.4                          | 3                            | 8          |
| 2/2/2011                 | 0833           | 23.0         | -                                    | 243                         | 87                                              | 34.5                      | 79.9                       | 27.8                          | 3.3                          | 8          |
| 2/2/2011                 | 0843           | 24.0         | -                                    | 52                          | 33                                              | 34.1                      | 74.2                       | 28.4                          | 1.2                          | 8          |
| 2/9/2011<br>2/9/2011     | 0858<br>0907   | 21.0<br>22.0 | -                                    | 52<br><b>228</b>            | 123<br>90                                       | 32.5<br>32.6              | 81.5<br>81.1               | 28.4<br>28.6                  | 3.3                          | 8          |
| 2/9/2011                 | 0907           | 23.0         | _                                    | 231                         | 87                                              | 32.5                      | 81.5                       | 28.4                          | 1.2                          | 8          |
| 2/9/2011                 | 0903           | 24.0         | <u> </u>                             | 10                          | 24                                              | 32.5                      | 79.3                       | 29.7                          | 1.7                          | 7.9        |
| 2/16/2011                | 0859           | 21.0         | _                                    | 10                          | 43                                              | 34.0                      | 103.7                      | 27.4                          | 7.8                          | 8          |
| 2/16/2011                | 0915           | 22.0         | _                                    | 20                          | 69                                              | 34.1                      | 99.8                       | 27.6                          | 3.6                          | 8.1        |
| 2/16/2011                | 0907           | 23.0         | -                                    | 10                          | 87                                              | 32.6                      | 88.3                       | 27.8                          | 4.3                          | 8          |
| 2/16/2011                | 0927           | 24.0         | -                                    | 10                          | 24                                              | 34.3                      | 98.1                       | 27.6                          | 1.6                          | 8.1        |
| 2/23/2011                | 0843           | 21.0         | -                                    | 20                          | 22                                              | 34.4                      | 96.9                       | 28.4                          | 5                            | 8.1        |
| 2/23/2011                | 0855           | 22.0         | -                                    | 10                          | 45                                              | 34.6                      | 94.6                       | 28.6                          | 2                            | 8.1        |
| 2/23/2011                | 0848           | 23.0         | -                                    | 934                         | 109                                             | 34.7                      | 89.6                       | 28.7                          | 3                            | 8.1        |
| 2/23/2011                | 0905           | 24.0         | -                                    | 10                          | 16                                              | 33.9                      | 88.6                       | 28.4                          | 2                            | 8.1        |
| 3/2/2011                 | 0856           | 21.0         | -                                    | 931                         | 68                                              | 31.8                      | 79.4                       | 27.5                          | 6.1                          | 7.8        |
| 3/2/2011                 | 0911           | 22.0         | -                                    | 86                          | 52                                              | 34.0                      | 82.9                       | 27.4                          | 2.6                          | 8          |
| 3/2/2011<br>3/2/2011     | 0905<br>0919   | 23.0<br>24.0 | -                                    | 86<br><b>857</b>            | 135<br>34                                       | 33.4                      | 91.6<br>84.9               | 27.3<br>27.4                  | 4.9<br>1.4                   | 7.9<br>8   |
| 3/2/2011                 | 1027           | 21.0         | -                                    | 31                          | 50                                              | 33.2                      | 97.5                       | 27.4                          | 2.3                          | 8.1        |
| 3/9/2011                 | 1027           | 22.0         | -                                    | 10                          | 33                                              | 34.8                      | 94.3                       | 27.2                          | 1                            | 8.1        |
| 3/9/2011                 | 1023           | 23.0         | -                                    | 41                          | <b>95</b>                                       | 34.6                      | 94.3                       | 27.5                          | 1.5                          | 8          |
| 3/9/2011                 | 1018           | 24.0         | -                                    | 10                          | 24                                              | 32.1                      | 94.7                       | 27.1                          | 1.4                          | 8.1        |
| 3/16/2011                | 0906           | 21.0         | -                                    | 10                          | 36                                              | 33.4                      | 82.7                       | 27.4                          | 1.8                          | 8          |
| 3/16/2011                | 0912           | 22.0         | -                                    | 20                          | 20                                              | 34.4                      | 87.7                       | 26.8                          | 2.3                          | 8          |
| 3/16/2011                | 0918           | 23.0         | -                                    | 52                          | 70                                              | 33.6                      | 80.2                       | 26.9                          | 2.2                          | 8          |
| 3/16/2011                | 0923           | 24.0         | -                                    | 10                          | 24                                              | 34.7                      | 76.8                       | 27.4                          | 1.6                          | 8          |
| 3/22/2011                | 0856           | 21.0         | -                                    | 146                         | 61                                              | 34.8                      | 99.6                       | 26.5                          | 1.5                          | 8          |
| 3/22/2011                | 0903           | 22.0         | -                                    | 10                          | 18                                              | 35.5                      | 98.7                       | 27.6                          | 2.2                          | 8.1        |
| 3/22/2011                | 0905           | 23.0         | -                                    | 97                          | 111                                             | 35.3                      | 97.2                       | 26.4                          | 1                            | 8.1        |
| 3/22/2011                | 0909           | 24.0         | -                                    | 10                          | 24                                              | 34.2                      | 96.1                       | 25.7                          | 0.98                         | 8.2        |
| 3/30/2011                | 0855           | 21.0         | -                                    | 52                          | 74                                              | 33.6                      | 79.9                       | 27.6                          | 2.2                          | 8          |
| 3/30/2011                | 0901           | 22.0         | -                                    | 20                          | 20                                              | 34.0                      | 89.0                       | 27.3                          | 2.6                          | 8          |
| 3/30/2011<br>3/30/2011   | 0906           | 23.0         | -                                    | 41                          | <b>59</b>                                       | 34.2                      | 92.0                       | 27.0                          | 1.8                          | 8          |
| 3/30/2011<br>4/6/2011    | 0912<br>0850   | 24.0<br>21.0 | <u>-</u>                             | 10<br><b>238</b>            | 24<br><b>56</b>                                 | 34.8                      | 79.8<br>88.6               | 27.7                          | 1.1                          | 7.8        |
| 4/6/2011                 | 0850           | 22.0         | -                                    | 109                         | 21                                              | 33.1                      | 91.4                       | 28.6<br>28.7                  | 7.5                          | 7.8        |
| 4/6/2011                 | 0905           | 23.0         | -                                    | 24196                       | 183                                             | 33.4                      | 89.9                       | 28.7                          | 3.8                          | 8.1        |
| 4/6/2011                 | 0905           | 24.0         | -                                    | 84                          | 15                                              | 33.5                      | 88.4                       | 28.7                          | 2.6                          | 8.1        |
| 4/13/2011                | 0858           | 21.0         | -                                    | 263                         | 86                                              | 34.4                      | 74.2                       | 27.0                          | 2.0                          | 8          |
| 4/13/2011                | 0905           | 22.0         | -                                    | 10                          | 21                                              | 33.6                      | 77.0                       | 26.9                          | 2.1                          | 8          |
| 4/13/2011                | 0912           | 23.0         | -                                    | 143                         | 235                                             | 34.1                      | 82.1                       | 27.2                          | 1.3                          | 8.1        |
| 4/13/2011                | 0918           | 24.0         |                                      | 10                          | 15                                              | 33.8                      | 79.5                       | 27.0                          | 1.7                          | 8          |
| 4/20/2011                | 0828           | 21.0         | -                                    | 450                         | 185                                             | 32.5                      | 72.7                       | 28.8                          | 6.6                          | 7.9        |
| 4/20/2011                | 0833           | 22.0         |                                      | 10                          | 19                                              | 32.5                      | 78.3                       | 28.9                          | 1.4                          | 7.9        |

Table C.23: Lagoon Water Quality Results, 2010-2011

|            |                |           | Fecal            | I              | Enterococci      |          | Dissolved |                   |                    |           |
|------------|----------------|-----------|------------------|----------------|------------------|----------|-----------|-------------------|--------------------|-----------|
|            |                |           | Coliform         | Enterococci    | (CFU/100 ml)     | Salinity | Oxygen    | Temperature       | Turbidity          |           |
| Date       | Time           | Site      | (CFU/100 ml)     | (CFU/100 ml)   | /GM <sup>1</sup> | $(\%)^2$ | (%)       | (°C) <sup>2</sup> | (NTU) <sup>2</sup> | pН        |
| Date       | Time           | Site      |                  | (CF 0/100 III) | /GIVI            | (700)    | (70)      | ( C)              | (1410)             | pm        |
| C) D (I II |                |           | $GM^1 < 200$ ,   | 104            | 25               | 10       | 7.        | 1.0               | 0.7                | 7.00      |
| CNMI W     | ater Quality S | Standards | <400 Single      | <104           | <35              | 10       | >75       | 1.0               | 0.5                | 7.6 - 8.6 |
|            |                |           | Sample*          |                |                  |          |           |                   |                    |           |
| 4/20/2011  | 0838           | 23.0      | -                | 31             | 212              | 34.2     | 60.1      | 29.3              | 1.7                | 7.9       |
| 4/20/2011  | 0844           | 24.0      | -                | 10             | 15               | 34.0     | 37.3      | 30.5              | 0.59               | 7.7       |
| 4/27/2011  | 0832           | 21.0      | -                | 20             | 124              | 33.6     | 76.5      | 29.4              | 10.2               | 7.9       |
| 4/27/2011  | 0836           | 22.0      | -                | 10             | 19               | 12.7     | 142.8     | 29.3              | 1.4                | 7.6       |
| 4/27/2011  | 0840           | 23.0      | -                | 10             | 134              | 32.7     | 61.0      | 29.9              | 3.4                | 7.7       |
| 4/27/2011  | 0844           | 24.0      | -                | 10             | 15               | 33.5     | 65.7      | 30.9              | 1.2                | 7.7       |
| 5/4/2011   | 0858           | 21.0      | -                | 10             | 89               | 34.7     | 34.7      | 26.2              | 1.4                | 8         |
| 5/4/2011   | 0901           | 22.0      | -                | 10             | 16               | 34.3     | 34.3      | 26.4              | 0.97               | 8.1       |
| 5/4/2011   | 0905           | 23.0      | -                | 10             | 101              | 35.2     | 35.2      | 26.5              | 1.7                | 8.1       |
| 5/4/2011   | 0912           | 24.0      | -                | 10             | 15               | 35.6     | 35.6      | 26.9              | 1.1                | 8         |
| 5/11/2011  | 0853           | 21.0      | -                | 85             | 73               | 34.9     | 86.9      | 29.4              | 2.5                | 7.9       |
| 5/11/2011  | 0855           | 22.0      | -                | 10             | 10               | 34.8     | 90.6      | 28.9              | 4.5                | 8.1       |
| 5/11/2011  | 0900           | 23.0      | -                | 10             | 21               | 34.8     | 88.6      | 28.8              | 2                  | 8         |
| 5/11/2011  | 0910           | 24.0      | -                | 10             | 10               | 34.8     | 90.4      | 29.8              | 2.5                | 8.1       |
| 5/18/2011  | 0844           | 21.0      | -                | 75             | 56               | 34.6     | 76.1      | 29.7              | 3.9                | 8.1       |
| 5/18/2011  | 0850           | 22.0      | -                | 10             | 10               | 33.2     | 84.7      | 29.7              | 1.5                | 8         |
| 5/18/2011  | 0857           | 23.0      | -                | 20             | 14               | 34.7     | 40.9      | 29.7              | 1.2                | 7.9       |
| 5/18/2011  | 0904           | 24.0      | -                | 10             | 10               | 35       | 47.9      | 31.2              | 2.2                | 7.9       |
| 5/25/2011  | 0811           | 21.0      | -                | 177            | 47               | 32.8     | 66.2      | 29.8              | -                  | 5.7       |
| 5/25/2011  | 0816           | 22.0      | -                | 20             | 11               | 13.2     | 102.5     | 28.2              | -                  | 2.5       |
| 5/25/2011  | 0819           | 23.0      | -                | 981            | 29               | 31.3     | 64.3      | 29.7              | -                  | 2.2       |
| 5/25/2011  | 0825           | 24.0      | -                | 10             | 10               | 33.2     | 55.1      | 31.7              | -                  | 4.5       |
| 6/1/2011   | 1036           | 21.0      | -                | 20             | 47               | 33.6     | 89.1      | 31                | 7.5                | 7.8       |
| 6/1/2011   | 1041           | 22.0      | -                | 10             | 11               | 33.8     | 91.1      | 29.8              | 4                  | 7.9       |
| 6/1/2011   | 1045           | 23.0      | -                | 30             | 36               | 33.6     | 86.8      | 29.7              | 2.5                | 7.8       |
| 6/1/2011   | 1052           | 24.0      | -                | 10             | 10               | 33.8     | 89.4      | 29.6              | 1.5                | 8         |
| 6/8/2011   | 0915           | 21.0      | -                | 52             | 65               | 35.3     | 72.3      | 30.3              | 17                 | 8         |
| 6/8/2011   | 0920           | 22.0      | -                | 10             | 11               | 31.1     | 74.5      | 30.5              | 1.4                | 7.8       |
| 6/8/2011   | 0926           | 23.0      | -                | 110            | 58               | 33.8     | 50.7      | 30.7              | 2.5                | 7.9       |
| 6/8/2011   | 0935           | 24.0      | -                | 10             | 10               | 33.9     | 79.8      | 30.4              | 1.9                | 8         |
| 6/13/2011  | 0859           | 21.0      | -                | 63             | 61               | 32.8     | 76.1      | 30.4              | 3.9                | 8         |
| 6/13/2011  | 0906           | 22.0      | -                | 30             | 14               | 33.6     | 90.8      | 30.3              | 2.8                | 8.1       |
| 6/13/2011  | 0913           | 23.0      | -                | 10             | 58               | 34.1     | 86.9      | 30.2              | 2.1                | 8.1       |
| 6/13/2011  | 0921           | 24.0      | -                | 20             | 11               | 34.3     | 92.9      | 30.3              | 1.3                | 8.1       |
| 6/22/2011  | 0909           | 21.0      | -                | 74             | 61               | 33.8     | 70.7      | 29.8              | 4.3                | 8         |
| 6/22/2011  | 0914           | 22.0      | -                | 84             | 22               | 33.1     | 76.3      | 30.2              | 2.7                | 7.9       |
| 6/22/2011  | 0921           | 23.0      | _                | 187            | 90               | 34       | 94.8      | 30                | 1.6                | 8         |
| 6/22/2011  | 0929           | 24.0      | _                | 10             | 11               | 34.3     | 87.9      | 30.2              | 0.94               | 8         |
| 6/29/2011  | 0828           | 21.0      | _                | 122            | 57               | 33.4     | 63.2      | 29.9              | 5                  | 7.9       |
| 6/29/2011  | 0834           | 22.0      | _                | 10             | 19               | 25.4     | 61.4      | 29.9              | 4                  | 7.6       |
| 6/29/2011  | 0839           | 23.0      | _                | 52             | 50               | 31.1     | 35.5      | 30.3              | 2.6                | 7.6       |
| 6/29/2011  | 0946           | 24.0      | _                | 52             | 16               | 33.5     | 51.4      | 31.8              | 6                  | 7.7       |
| 1          |                |           | rer a 30-dav pei |                |                  | 23.3     |           | 21.0              | <u>J</u>           | , . ,     |

<sup>&</sup>lt;sup>1</sup>GM in not less than four samples over a 30-day period.

GM = geometric mean

CFU = colony forming units

ml = milliliter

 $NTU = nephelometric \ turbidity \ units$ 

 $PO_4$  = orthophosphate

**Bold** values exceed CNMI water quality standards.

Grey-shaded values exceed 2.5, a non-regulatory assigned value for coastal waters to approximate ambient conditions in a healthy reef system.

<sup>&</sup>lt;sup>2</sup> Shall not exceed ambient by more than the stated value.

<sup>- =</sup> data not available

<sup>% =</sup> percent

<sup>% =</sup> per mil (parts per thousand)

<sup>°</sup>C = degrees Celsius

Table C.24: Average Values of Lagoon Water Quality Results, Wet versus Dry Season, 2010-2011

| Location  | Enterococci<br>(CFU/100 ml) | Enterococci<br>(CFU/100 ml)<br>/GM | Salinity<br>(‰) | Dissolved<br>Oxygen<br>(%) | Temperature (°C) | Turbidity<br>(NTU) | pН   |
|-----------|-----------------------------|------------------------------------|-----------------|----------------------------|------------------|--------------------|------|
| WB 21 Wet | 989.5                       | 191.5                              | 33.3            | 83.4                       | 29.7             | 5.21               | 7.99 |
| WB 21 Dry | 144.0                       | 82.2                               | 33.3            | 80.1                       | 28.5             | 4.80               | 7.88 |
| WB 22 Wet | 50.3                        | 29.4                               | 33.5            | 87.7                       | 30.0             | 2.34               | 8.00 |
| WB 22 Dry | 58.5                        | 32.0                               | 32.0            | 86.6                       | 28.6             | 2.52               | 7.79 |
| WB 23 Wet | 188.3                       | 59.1                               | 32.1            | 88.9                       | 29.8             | 2.95               | 8.02 |
| WB 23 Dry | 955.0                       | 87.7                               | 33.5            | 78.2                       | 28.7             | 2.51               | 7.78 |
| WB 24 Wet | 15.9                        | 13.8                               | 33.3            | 82.2                       | 30.6             | 2.06               | 7.97 |
| WB 24 Dry | 47.2                        | 17.4                               | 33.8            | 76.3                       | 29.1             | 1.90               | 7.86 |

% = percent

% = per mil (part per thousand)

°C = degrees Celsius

CFU = colony forming units

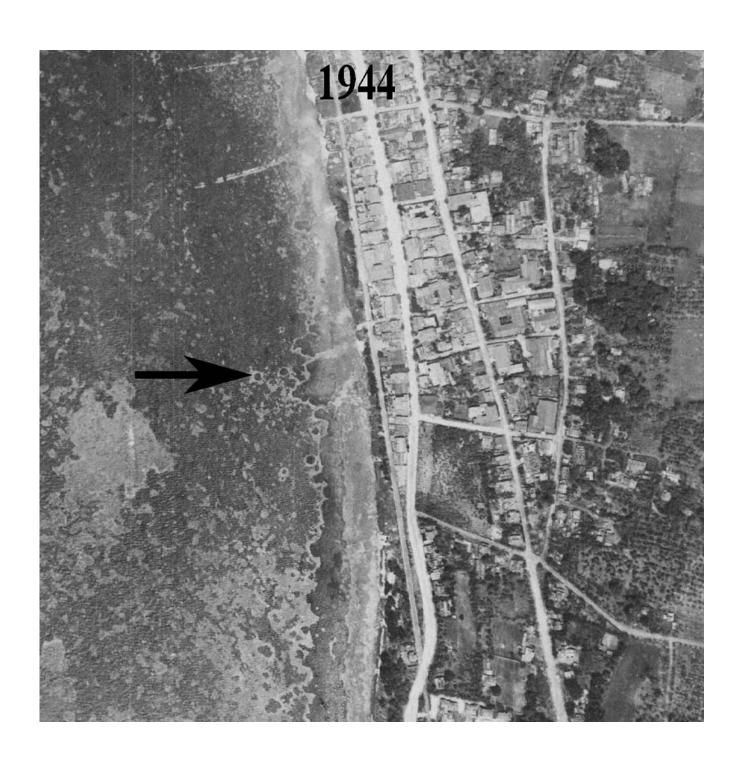
GM = geometric mean

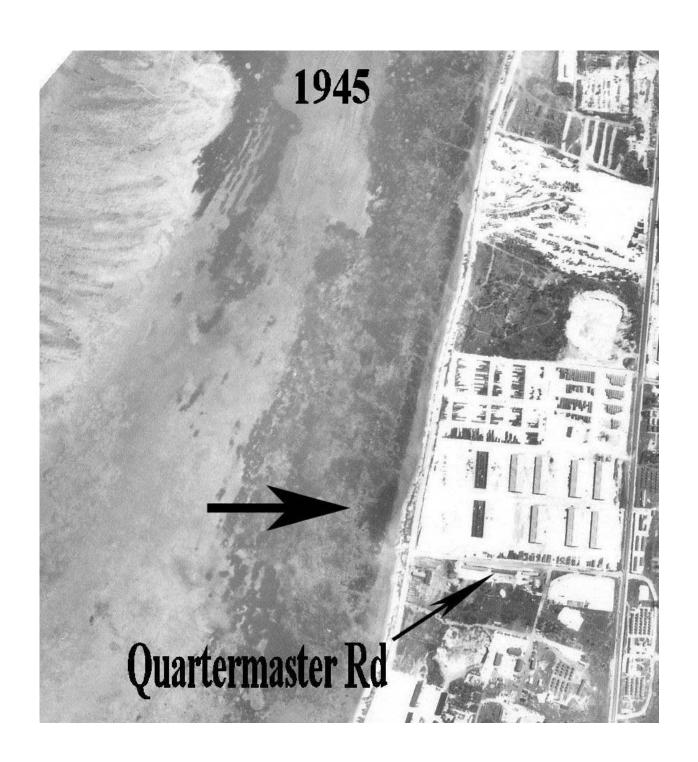
ml = milliliter

NTU = nephelometric turbidity units

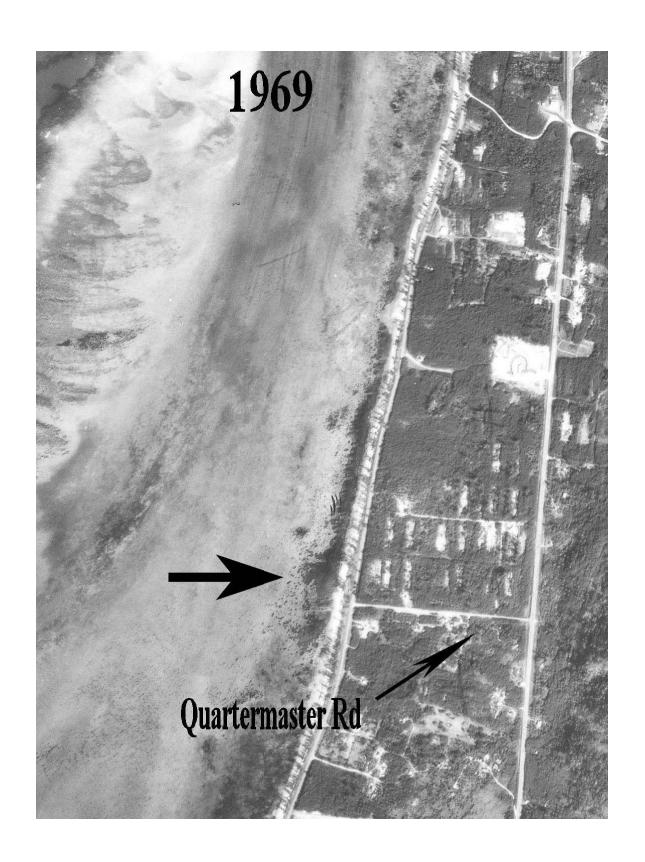
 $PO_4$  = orthophosphate

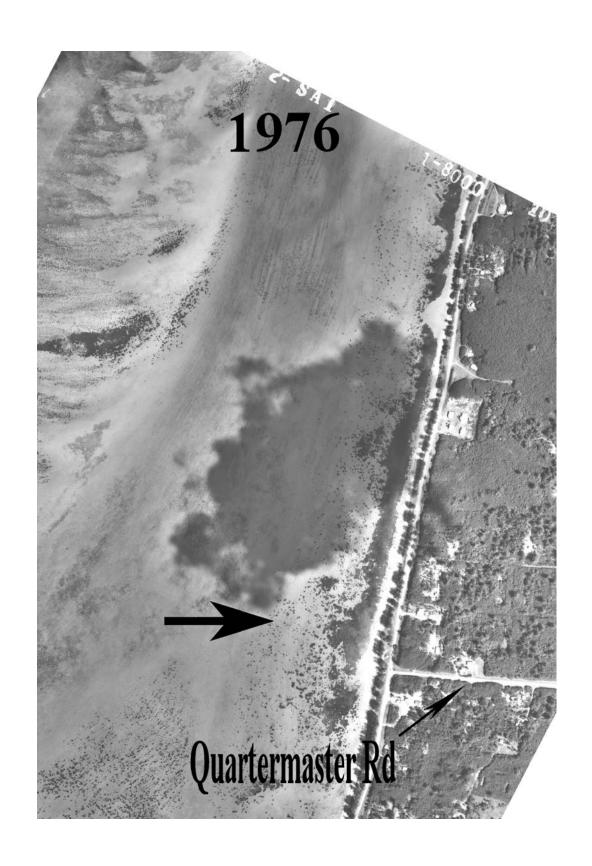
Appendix D Historical Aerial Photographs

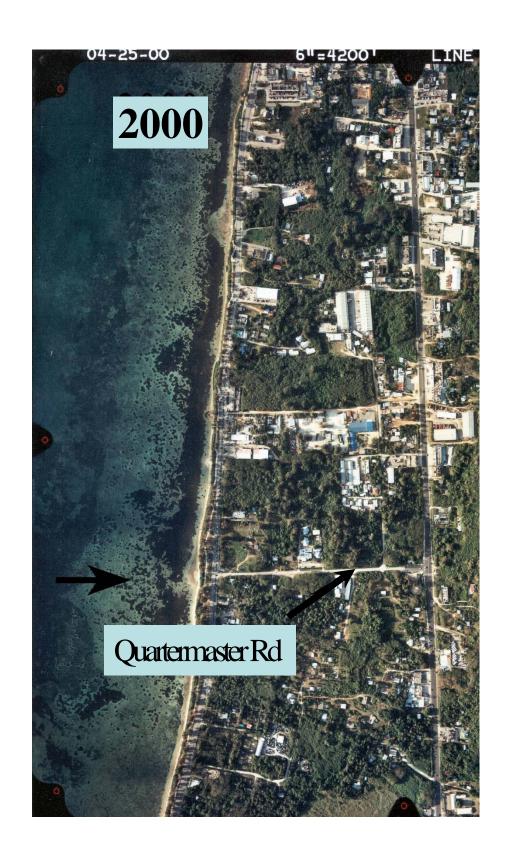


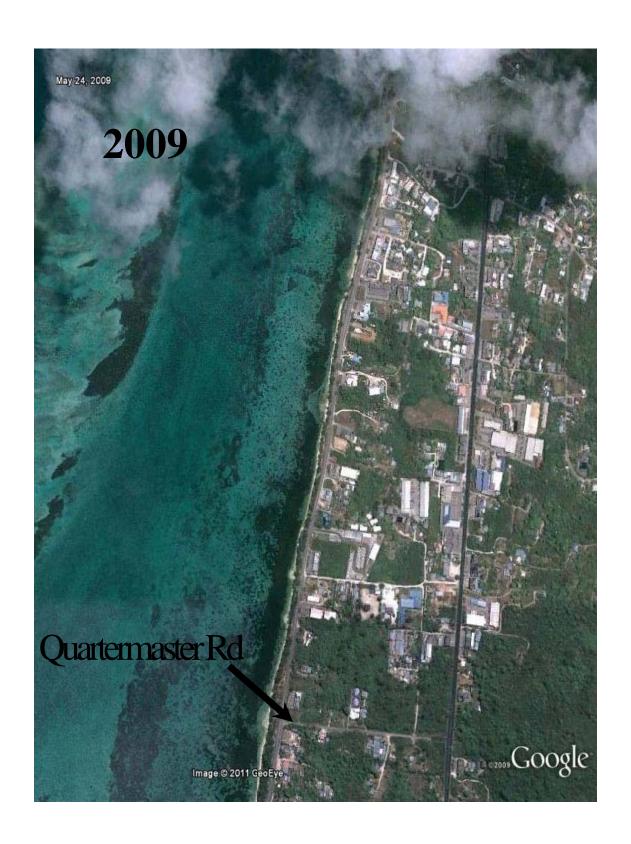














Sediment plume at runoff discharge point.



Unpaved roads in West Takpochao watershed.



Stormwater runoff during Typhoon Tingting.



Nuisance algae growth near Dai Ichi Canal.



Land-clearing activities within the West Takpochao watershed.



Stormwater runoff during the May 8, 2002 rain event, Drain 6.



Agricultural land use in close proximity to the coast.



Sediment plume adjacent to Drain 6 during May 8, 2002 rain event.



Sediment delta October 2001.



Stormwater runoff outfall point.



Nearshore seagrass beds.



Surface flooding during a rainfall event.



Surface flooding and runoff during a rain event.



Overview of the Cock Fight Arena site facing northeast.



Nuisance algae growth along shoreline.



Existing cock fight arena.



Cock Fight Arena site behind the existing arena.



View of Quartermaster site to the right.



Overview of China House site from golf course located on Middle Road.



Overview of Quartermaster site.

Appendix F
Preliminary Drainage Design Report

# PRELIMINARY DRAINAGE DESIGN FOR AQUATIC ECOSYSTEM RESTORATION STUDY SAIPAN LAGOON SAIPAN, NOTHERN MARIANA ISLANDS

Prepared for:
U.S Army Corps of Engineers
Honolulu District
&
Environet Inc.

Prepared by: Community Planning & Engineering, Inc. 1100 Alakea, Sixth Floor Honolulu, HI 96813

January 2012

# Table of Contents

| Section 1 Hydrology                       | 1-1 |
|-------------------------------------------|-----|
| Section 2 Hydraulics                      | 2-1 |
| Section 3 Quartermaster Site              | 3-1 |
| 3.1 2-Year Storm Event                    | 3-1 |
| 3.2 5-Year Storm Event                    | 3-1 |
| 3.3 10-Year Storm Event                   | 3-2 |
| Section 4 China House Site                | 4-1 |
| 4.1 2-Year Storm Event                    | 4-1 |
| 4.2 5-Year Storm Event                    |     |
| 4.3 10-Year Storm Event                   | 4-2 |
| Section 5 Cock Fight Arena Site           | 5-1 |
| 5.1 2-Year Storm Event                    | 5-1 |
| 5.2 5-Year Storm Event                    | 5-1 |
| 5.3 10-Year Storm Event.                  | 5-2 |
| Section 6 Conclusion                      | 6-1 |
| Section 7 References                      | 6-1 |
| List of Figures  Overall Plan and Key Map | 1   |
| Quarter Master Site                       |     |
| 2-Year Storm Event Preliminary Design     |     |
| 5-Year Storm Event Preliminary Design     |     |
| 10-Year Storm Event Preliminary Design    |     |
| China House Site                          | 3   |
| 2-Year Storm Event Preliminary Design     | 3 1 |
| 5-Year Storm Event Preliminary Design     |     |
| 10-Year Storm Event Preliminary Design    |     |
| Cock Fight Arena Site                     | 4   |
| 2-Year Storm Event Preliminary Design     | 4.1 |
| 5-Year Storm Event Preliminary Design     |     |
| 10-Year Storm Event Preliminary Design    |     |

# Appendix A

| Quartermaster Site    | A-1  |
|-----------------------|------|
| 2-Year Storm Event    | A-1  |
| 5-Year Storm Event    |      |
| 10-Year Storm Event   |      |
| China House Site      | A-13 |
| 2-Year Storm Event    | A-13 |
| 5-Year Storm Event    | A-17 |
| 10-Year Storm Event   | A-21 |
| Cock Fight Arena Site | A-25 |
| 2-Year Storm Event.   | A-25 |
| 5-Year Storm Event    | A-29 |
| 10-Year Storm Event.  |      |

# Section 1 Hydrology

Three low-lying areas in the West Takapochao watershed were selected for evaluation as possible drainage detention basins. These sites include vacant land adjacent to Quartermaster Road, the China House, and the Cockfight Arena; see Figure 1. These three areas currently flood during heavy rains.

During heavy rains the initial rainfall will produce the most sediment, nutrients and pollutants, known as the "first flush." In order to represent this "first flush" a one-hour intensity storm over a one hour duration has been applied to the analyses. Three storm events were evaluated in this report; 2-year, 5-year, and 10-year recurrence storms. Storm event data were utilized from the "Rainfall – Frequency Study, Saipan Commonwealth of Northern Marianas Islands, Contract No. DACA83-01-D-0014", prepared by Environet, Incorporated, dated April 2003.

Table 1: Saipan International Airport Rainfall Data – 60 minute Duration Storm Events

| Return Frequency | Cumulative Rainfall (inches) | Rainfall Intensity (inches/ hour) <sup>1</sup> |
|------------------|------------------------------|------------------------------------------------|
|                  | /                            | /                                              |
| $X_{10}$         | 3.06                         | 3.06                                           |
| $X_5$            | 2.61                         | 2.61                                           |
| $\overline{X_2}$ | 1.93                         | 1.93                                           |

1 From Table 4-6 and Table 4-7 in the "Rainfall – Frequency Study"

The watershed analysis for each storm and site was performed using the computer software program Hydrologic Modeling System HEC-HMS, version 3.5 and can be found in Appendix A. The Soil Conservation Service (now the Natural Resource Conservation Service) curve number was applied to the analyses along with the SCS unit hydrograph to symbolize the direct runoff over the watersheds. The lag time for the unit hydrograph was assumed to equal the time of concentration. No baseflow is assumed in the analyses. The simulations were ran over a 24-hour time period.

# Section 2 Hydraulics

HEC-HMS version 3.5 was also used to perform the analysis on the proposed detention basins. Elevation-area functions were used to specify the storage relationships. The outlet structure routing method was used to perform the reservoir routing. The simulations were routed through reinforced concrete outlet pipes (RCP) that were sized according to the analysis and existing site conditions. The RCP outlet pipes are to be wrapped in filter cloth and gravel, and are to be located 1'-2' above the bottom of the detention basin. This will allow sediment to settle out in the basin and will require periodic removal of sediment from the basins. The simulations were ran over a 24-hour time period.

Each watershed was analyzed separately for the three storm events. A preliminary design of the required improvements was completed for each event and each site. The preliminary designs are further explained in detail in the following sections. Each design is based upon 100% of the design storm runoff passing through the detention basin. The analysis assumes that the topographic conditions and existing drainage facilities adequately convey storm flows to the proposed detention basins. Detailed as-built information and condition surveys about existing storm drain systems were not available; nor were detailed surveys of the proposed sites. This information will be necessary for implementation of the final design of the proposed detention basins. For the purposes of preliminary design and comparison, assumptions were made regarding the sites and existing drain systems. These assumptions are identified in the following sections and/or on the figures. It should also be noted that the Quartermaster Site and the Cock Fight Arena are currently on private property. This report does not address acquiring such properties and that it is assumed that all lands used for the proposed detention basins can or will be acquired by the CNMI Government.

# Section 3 Quartermaster Site

## 3.1 Existing Conditions

The Quartermaster Site is located at the northwest corner of the intersection of Quartermaster Road and Middle Road. The site is currently vacant and overgrown with vegetation. The site generally slopes to the southwest corner at approximately 4-5%.

The watershed which is tributary to the site is approximately 109 acres. The wtershed is mostly undeveloped, mountainous terrain. The bottom of the watershed, adjacent to Middle Road is more moderately sloped and developed with residential and commercial buildings, roads, and associated improvements. The watershed has an average slope of approximately 23%.

The storm runoff concentrates along the east side of Middle Road at a low point on the northern side of the Quartermaster Road intersection. There is an existing catch basin at this location which will continue to be utilized.

Condition of existing drainage facilities is unknown and may require repair or replacement. Existing facilities were assumed as shown on figures 2.1, 2.2 and 2.3.

#### 3.2 2-Year Storm Event

The 2-year storm event will produce a peak runoff of approximately 20.8 cfs. The runoff will be routed through a proposed detention basin providing approximately 1.52 ac-ft of storage from elevations 23 feet - 32 feet. Discharge from the detention basin will enter an existing swale via an 18 inch RCP outlet and flow along the north side of Quartermaster Road running westward toward Beach Road and the Lagoon. Figure 2.1 depicts the required improvements to the Quartermaster site to detain the 2-year storm event. With the proposed improvements, the detention basin will pond approximately to elevation 26.8 feet, and the peak discharge from the detention basin will be approximately 7.7 cfs.

#### 3.3 5-Year Storm Event

The 5-year storm event will produce a peak runoff of approximately 75.0 cfs. The runoff will be routed through a proposed detention basin providing approximately 4.89 ac-ft of storage from elevations 23 feet – 32 feet. Discharge from the detention basin will enter an existing swale via an 18 inch RCP outlet and flow along the north side of Quartermaster Road running westward toward Beach Road and the Lagoon. Figure 2.2 depicts the required improvements to the Quartermaster site to detain the 5-year storm event. With the proposed improvements, the detention basin will pond approximately to elevation 27.9 feet, and the peak discharge from the detention basin will be approximately 12.4 cfs.

#### 3.4 10-Year Storm Event

The 10-year storm event will produce a peak runoff of approximately 118.5 cfs. The runoff will be routed through a proposed detention basin providing approximately 6.92 ac-ft of storage from elevations 23 feet – 32 feet. Discharge from the detention basin will enter an existing swale via an 18 inch RCP outlet and flow along the north side of Quartermaster Road running westward toward Beach Road and the Lagoon. Figure 2.3 depicts the required improvements to the Quartermaster site to detain the 10-year storm event. With the proposed improvements, the detention basin will pond approximately to elevation 28.9 feet, and the peak discharge from the detention basin will be approximately 14.5 cfs.

# Section 4 China House Site

#### 4.1 Existing Conditions

The China House Site is located near the China House Restaurant and the driving range, about halfway between Middle Road and Beach Road. The site is currently undeveloped and overgrown with vegetation. However there are abandoned structures on the property which will need to be demolished. The site generally slopes to the west at approximately 3.5%.

The watershed which is tributary to the site is approximately 344 acres. The watershed is mixed between undeveloped, mountainous terrain and areas developed with residential and commercial buildings, roads, and associated improvements. The watershed has an average slope of approximately 16%.

The storm runoff concentrates along the east side of Middle Road at a low point in the road. There is an existing catch basin at this location which will continue to be utilized. Each storm event requires improvements starting at this existing catch basin, which are further detailed in the following sections.

Condition of existing drainage facilities is unknown and may require repair or replacement. Existing facilities were assumed as shown on figures 3.1, 3.2 and 3.3.

#### 4.2 2-Year Storm Event

The 2-year storm event will produce a peak runoff of approximately 51.9 cfs. The runoff will be routed through a proposed detention basin providing approximately 4.77 ac-ft of storage from elevations 20 feet – 29 feet. An 18 inch RCP outlet will discharge from the detention basin to an existing double 30 inch culvert under Beach Road, discharging to the Lagoon. Figure 3.1 depicts the required improvements to the China House site to detain the 2-year storm event. With the proposed improvements, the detention basin will pond approximately to elevation 24.4 feet, and the peak discharge from the detention basin will be approximately 15.0 cfs.

#### 4.3 5-Year Storm Event

The 5-year storm event will produce a peak runoff of approximately 178.6 cfs. The runoff will be routed through a proposed detention basin providing approximately 13.54 ac-ft of storage from elevations 19 feet – 29 feet. An 18 inch outlet pipe will discharge from the detention basin to an existing double 30 inch culvert under Beach Road, discharging to the Lagoon. Figure 3.2 depicts the required improvements to the China House site to detain the 5-year storm event. With the proposed improvements, the detention basin will pond approximately to elevation 26.8 feet, and the peak discharge from the detention basin will be approximately 15.6 cfs.

#### 4.4 10-Year Storm Event

The 10-year storm event will produce a peak runoff of approximately 284.0 cfs. The runoff will be routed through a proposed detention basin providing approximately 15.84 ac-ft of storage from elevations 18 feet – 30 feet. A 36 inch outlet pipe will discharge from the detention basin to an existing double 30 inch culvert under Beach Road, then discharging to the Lagoon. Figure 3.3 depicts the required improvements to the China House site to detain the 10-year storm event. With the proposed improvements, the detention basin will pond approximately to elevation 27.9 feet, and the peak discharge from the detention basin will be approximately 91.1 cfs.

# Section 5 Cock Fight Arena Site

## 5.1 Existing Conditions

The Cock Fight Arena Site is located on the east side of Middle Road, surrounding the existing Cock Fight Arena. The site is currently developed as a Cock Fight Arena, and portions were utilized as a quarry. The site generally slopes to the quarry pit.

The watershed which is tributary to the site is approximately 413 acres. The watershed is mainly undeveloped, mountainous terrain with some minor areas developed with residential and commercial buildings, roads, and associated improvements. The watershed has an average slope of approximately 12%.

Condition of existing drainage facilities is unknown and may require repair or replacement. Existing facilities were assumed as shown on figures 4.1, 4.2 and 4.3.

#### 5.2 2-Year Storm Event.

The 2-year storm event will produce a peak runoff of approximately 20.9 cfs. The runoff will be routed through a proposed detention basin providing approximately 11.85 ac-ft of storage from elevations 37 feet – 45 feet. An 18 inch outlet pipe will discharge from the detention basin to the Lagoon following existing paved roadways. Figure 4.1 depicts the required improvements to the Cock Fight Arena site to retain the 2-year storm event. The pit is currently sufficiently sized to accommodate the 2-year storm event; however, inlet improvements are required and outlet improvements are recommended. With the proposed improvements, the detention basin will pond approximately to elevation 40.3 feet, and the peak discharge from the detention basin will be approximately 4.4 cfs.

Based upon the minimal topographic information provided, it appears that the Cock Fight Arena's finish floor is approximately 43 feet in elevation. Additional investigation of the Arena and the pit should be performed to verify that ponding will not flood the Arena.

#### 5.3 5-Year Storm Event

The 5-year storm event will produce a peak runoff of approximately 95.9 cfs. The runoff will be routed through a proposed detention basin providing approximately 11.85 ac-ft of storage from elevations 37 feet – 45 feet. An 18 inch outlet pipe will discharge from the detention basin to the Lagoon following existing paved roadways. Figure 4.2 depicts the required improvements to the Cock Fight Arena site to detain the 5-year storm event. The pit is currently sufficiently sized to accommodate the 5-year storm event; however, inlet and outlet improvements are required. With the proposed improvements, the detention basin will pond approximately to elevation 43.4 feet, and the peak discharge from the detention basin will be approximately 14.0 cfs.

Based upon the minimal topographic information provided, it appears that the Cock Fight Arena's finish floor is approximately 43 feet in elevation. Additional investigation of the Arena and the pit should be performed to verify that ponding will not flood the Arena. If flooding will occur, modifications can be made to the pit, or outlet structures. Alternatively, the Arena may be demolished.

#### 5.4 10-Year Storm Event.

The 10-year storm event will produce a peak runoff of approximately 164.7 cfs. The runoff will be routed through a proposed detention basin providing approximately 14.23 ac-ft of storage from elevations 37 feet – 45 feet. A 24 inch outlet pipe will discharge from the detention basin to the Lagoon following existing paved roadways. Figure 4.3 depicts the required improvements to the Cock Fight Arena site to detain the 10-year storm event. Improvements to the pit will include some grading at the base of the existing pit, the walls of the pit and limits of the pit will not require expansion. In addition, inlet and outlet improvements are required. With the proposed improvements, the detention basin will pond approximately to elevation 44.6 feet, and the peak discharge from the detention basin will be approximately 30.3 cfs.

Based upon the minimal topographic information provided, it appears that the Cock Fight Arena's finish floor is approximately 43 feet in elevation. Additional investigation of the Arena and the pit should be performed to verify whether ponding will flood the Arena. It appears likely that the Arena will need to be demolished, or additional modifications will need to be made to the pit, or outlet structures.

# Section 6 Conclusion

For each of the alternatives the detention basins were designed to provide adequate storage, detention times and outlet design to reduce outflow and improve water quality.

In addition to the detention basins, each site will include a perimeter fence and a paved access driveway to the bottom of each basin for safety and maintenance.

Additional topographic information will be required to finalize actual designs for any selected sites. Condition assessments of existing drainage facilities should also be performed.

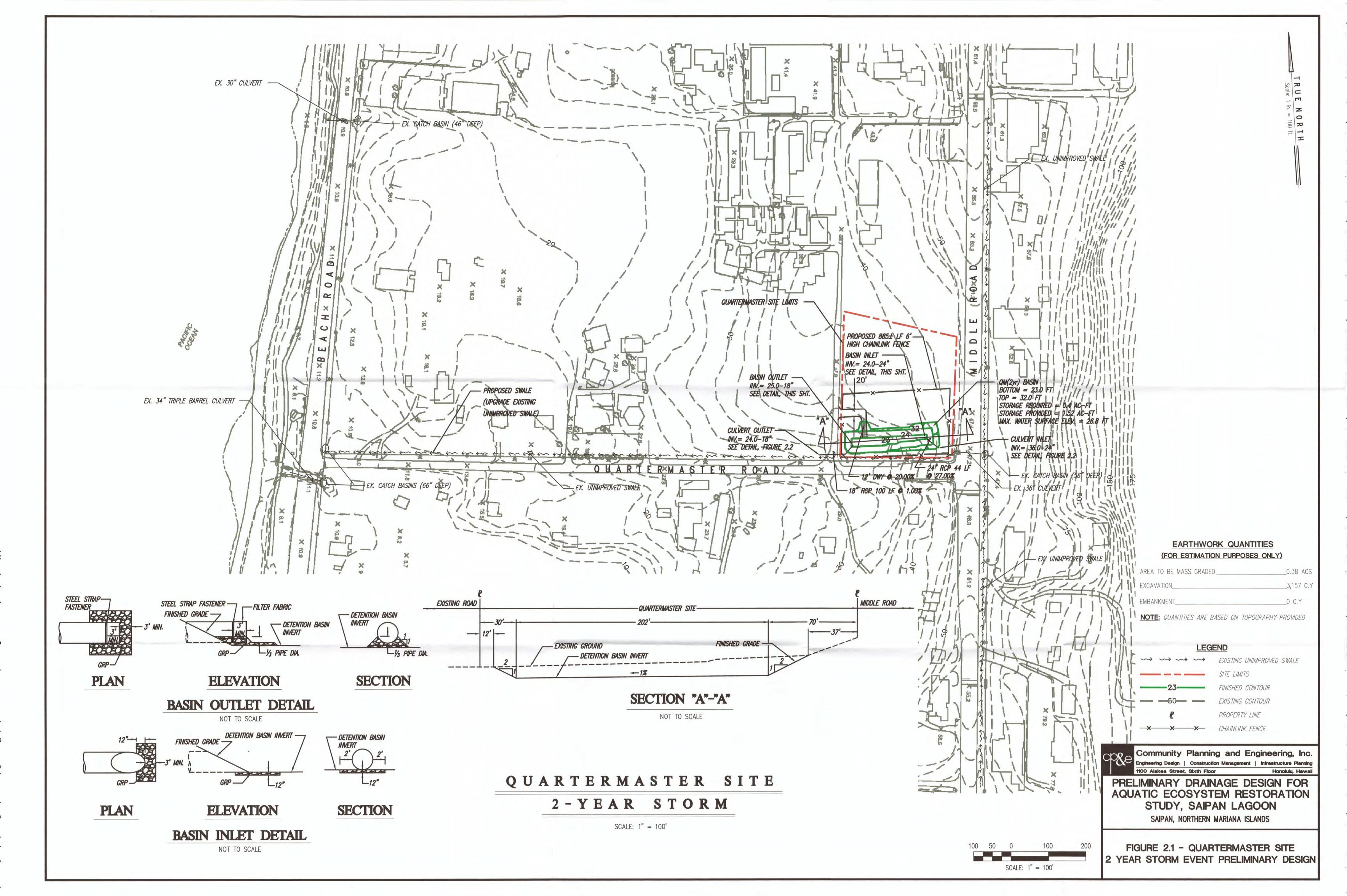
The analysis provided herein along with the preliminary designs proposed, provide the U.S. Army Corps of Engineers (USACOE) with information to prepare cost-benefit analysis of the proposed sites and each of the storm event situations.

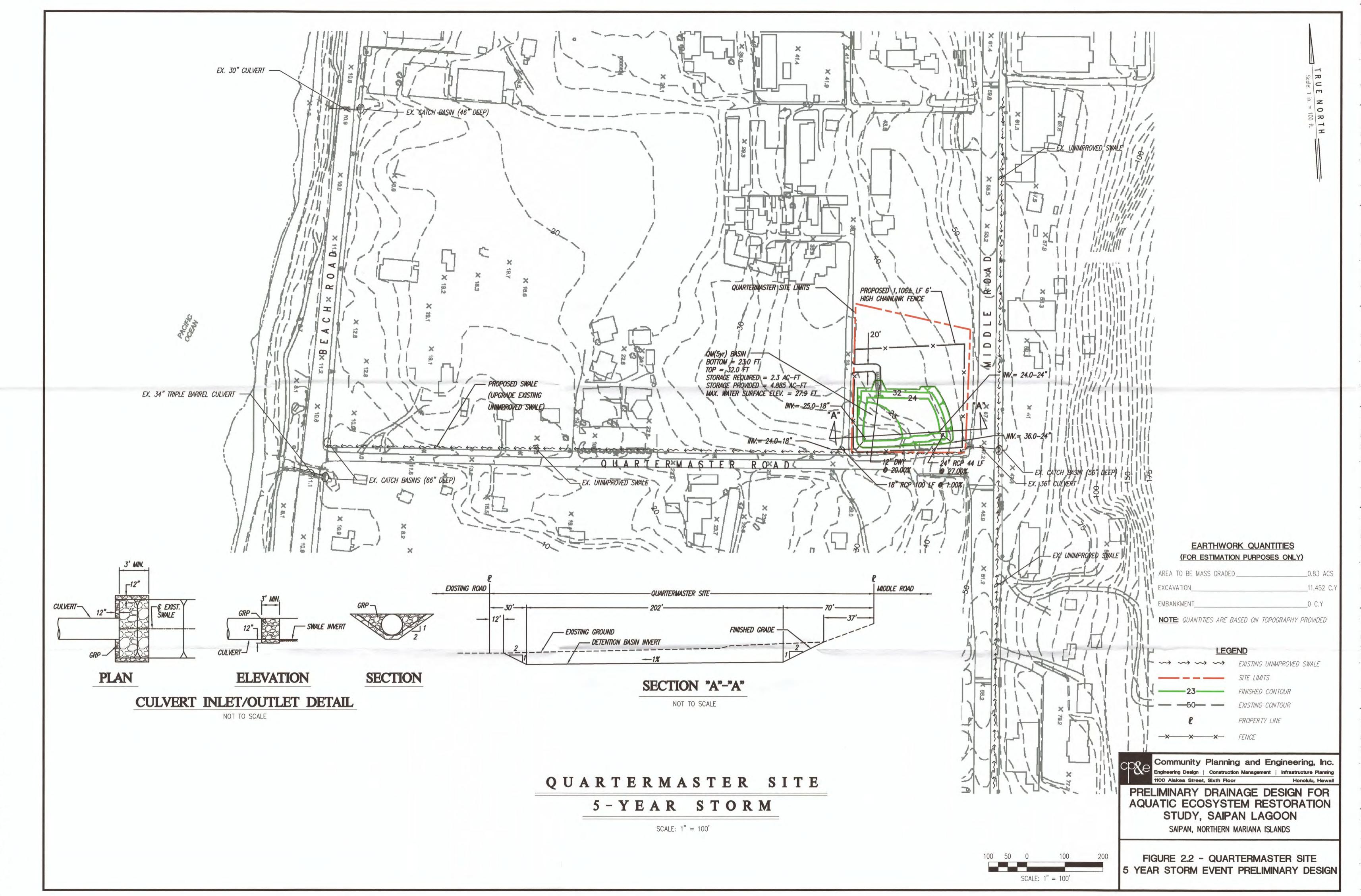
# Section 7 References

EI, 2003. Rainfall-Frequency Study, Saipan, Commonwealth of Northern Marianas Islands. Report prepared for U.S. Army Corps of Engineers, dated April 2003.



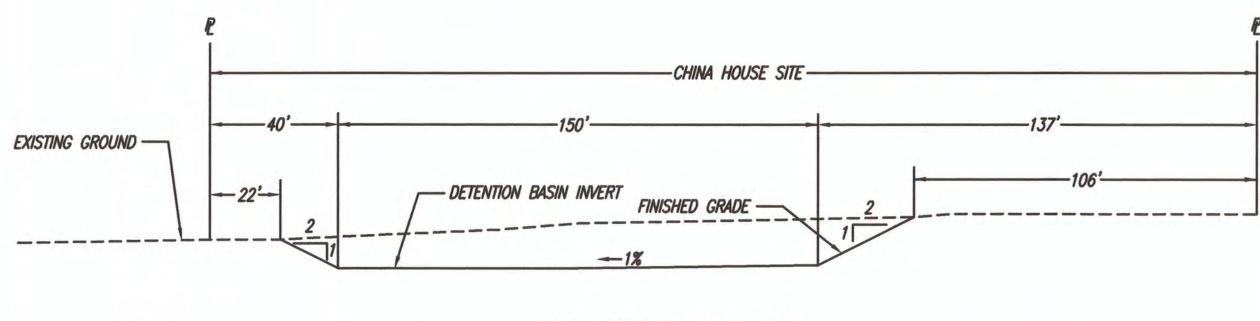
P:\Land Projects\Saipan Lagoon\PDF-TIFF\Figures.dwg, 1/14/2012 3:58:40 PM, HP





P:\Land Projects\Saipan Lagoon\PDF-TIFF\Figures.dwg, 1/14/2012 7:20:49 PM, HP DesignJet 1050C by HP (to

P:\Land Projects\Saipan Lagoon\PDF-TIFF\Figures.dwg, 1/14/2012 4:38:20 PM, HP DesignJet 1050C by HP (temporary).pc3



SECTION "A"-"A"

NOT TO SCALE

CHINA HOUSE SITE 2-YEAR STORM

SCALE: 1" = 100'

# EARTHWORK QUANTITIES (FOR ESTIMATION PURPOSES ONLY)

NORTH

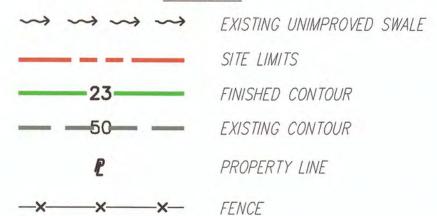
| AREA TO BE MASS GRADED | 0.79 AC |
|------------------------|---------|
| EXCAVATION             | 7,939 C |
| FMBANKMENT             | 0 C Y   |

NOTE: QUANTITIES ARE BASED ON TOPOGRAPHY PROVIDED

# NOTE

DRAIN LENGTH MAY BE SHORTENED IF DITCH ON ADJACENT PROPERTY IS NEAR SITE.

# LEGEND



Community Planning and Engineering, Inc.

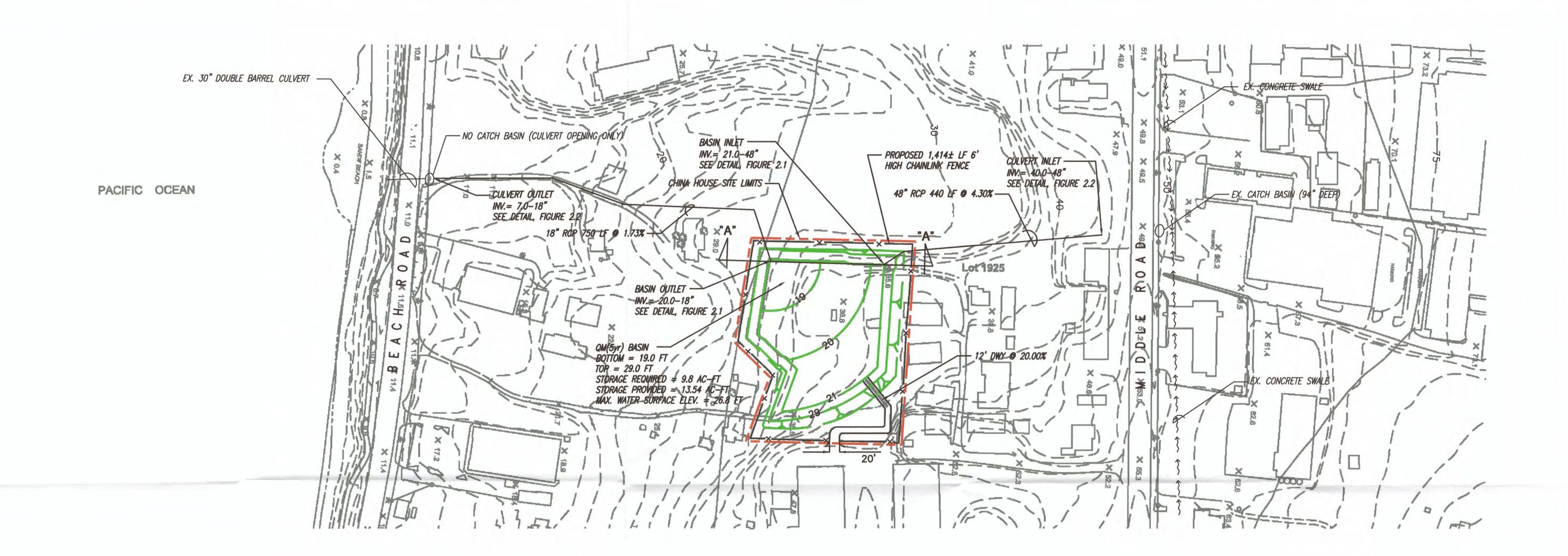
Engineering Design | Construction Management | Infrastructure Planning

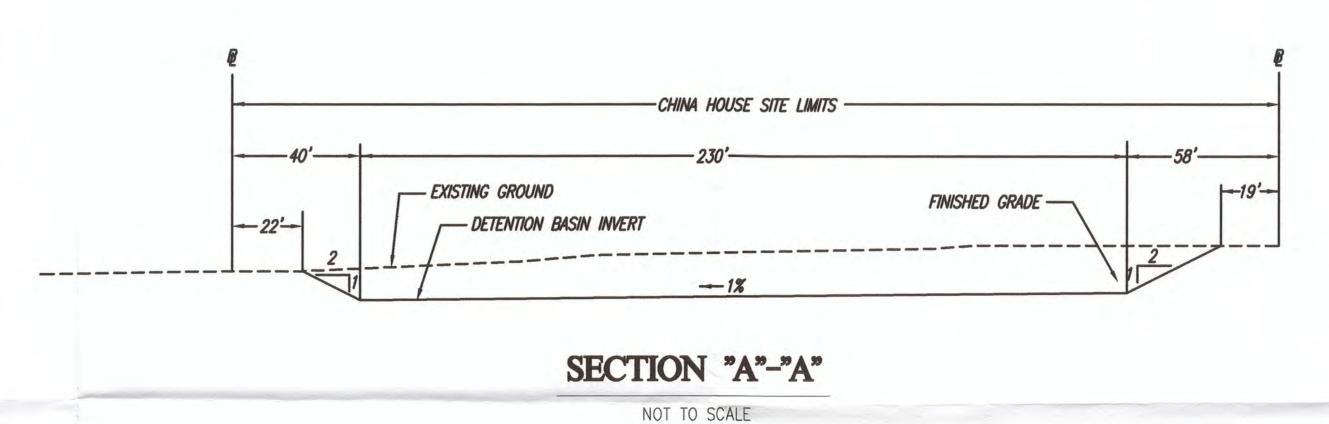
1100 Alakea Street, Sixth Floor Honolulu, Hawaii

PRELIMINARY DRAINAGE DESIGN FOR AQUATIC ECOSYSTEM RESTORATION STUDY, SAIPAN LAGOON SAIPAN, NORTHERN MARIANA ISLANDS

FIGURE 3.1 - CHINA HOUSE SITE 2 YEAR STORM EVENT PRELIMINARY DESIGN

100 50 0 100 200 SCALE: 1" = 100'





# -> -> -> EXISTING UNIMPROVED SWALE SITE LIMITS **-23** FINISHED CONTOUR — 50— EXISTING CONTOUR PROPERTY LINE **—X——X—** FENCE

DRAIN LENGTH MAY BE SHORTENED IF DITCH ON

LEGEND

ADJACENT PROPERTY IS NEAR SITE.

EARTHWORK QUANTITIES

(FOR ESTIMATION PURPOSES ONLY)

EMBANKMENT\_\_\_\_\_O C.Y

NOTE: QUANTITIES ARE BASED ON TOPOGRAPHY PROVIDED

NOTE

AREA TO BE MASS GRADED \_\_\_\_\_\_\_2.06 ACS

EXCAVATION\_\_\_\_\_29,129 C.Y

TRUE NORTH Scale: 1 in. = 100 ft.

Community Planning and Engineering, Inc. Engineering Design | Construction Management | Infrastructure Planning

PRELIMINARY DRAINAGE DESIGN FOR AQUATIC ECOSYSTEM RESTORATION STUDY, SAIPAN LAGOON SAIPAN, NORTHERN MARIANA ISLANDS

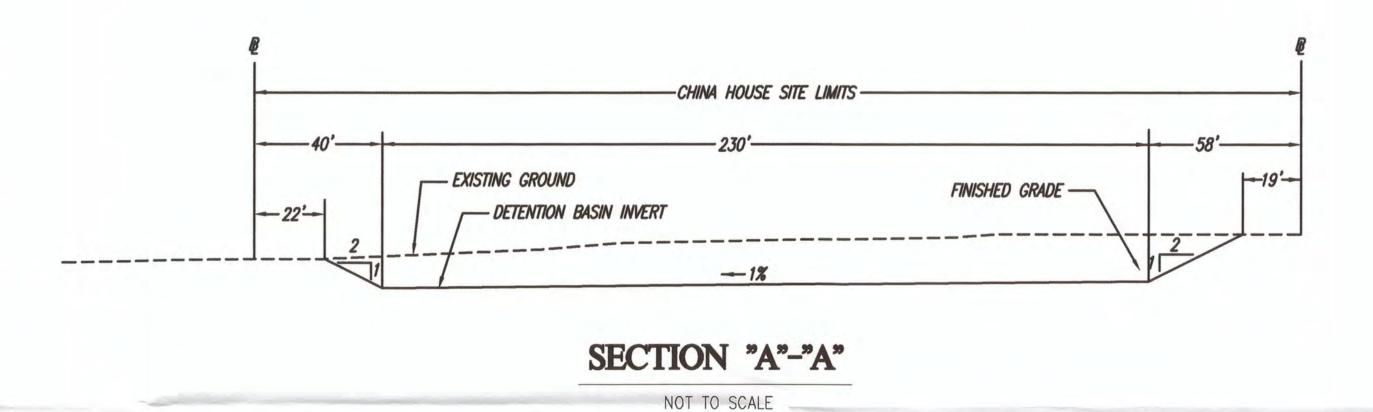
FIGURE 3.2 - CHINA HOUSE SITE

CHINA HOUSE SITE 5-YEAR STORM

SCALE: 1" = 100'







# **EARTHWORK QUANTITIES** (FOR ESTIMATION PURPOSES ONLY)

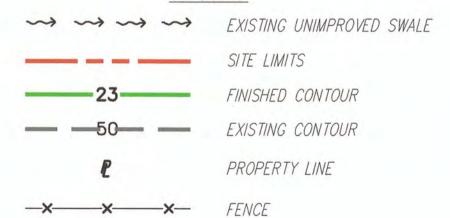
AREA TO BE MASS GRADED \_\_\_\_\_\_2.12 ACS \_\_\_\_29,392 C.Y EXCAVATION EMBANKMENT\_\_\_\_\_O C.Y

NOTE: QUANTITIES ARE BASED ON TOPOGRAPHY PROVIDED

# NOTE

DRAIN LENGTH MAY BE SHORTENED IF DITCH ON ADJACENT PROPERTY IS NEAR SITE.

# LEGEND



Community Planning and Engineering, Inc.

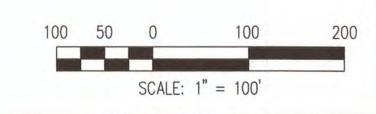
PRELIMINARY DRAINAGE DESIGN FOR AQUATIC ECOSYSTEM RESTORATION STUDY, SAIPAN LAGOON

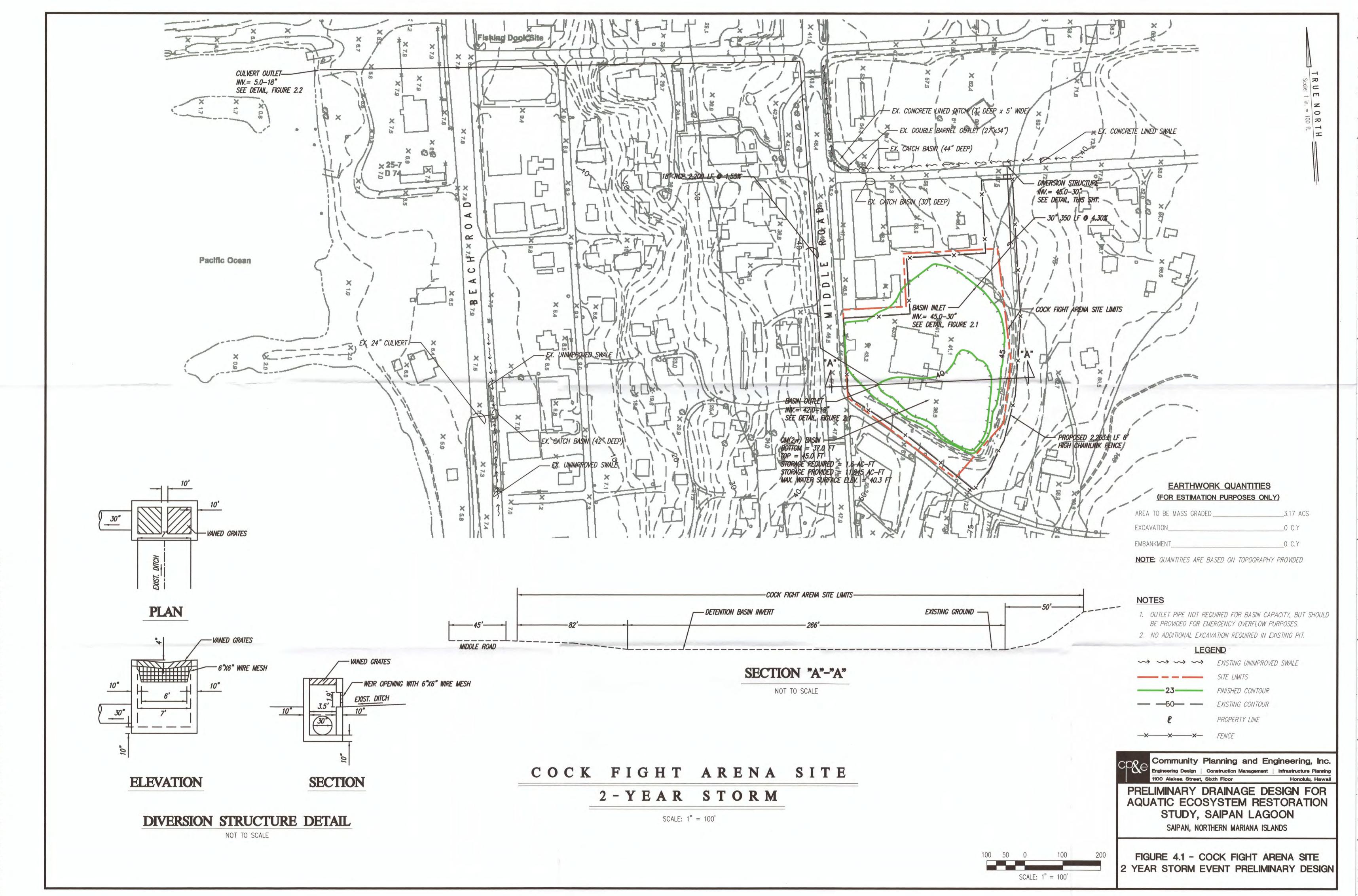
SAIPAN, NORTHERN MARIANA ISLANDS

FIGURE 3.3 - CHINA HOUSE SITE 10 YEAR STORM EVENT PRELIMINARY DESIGN

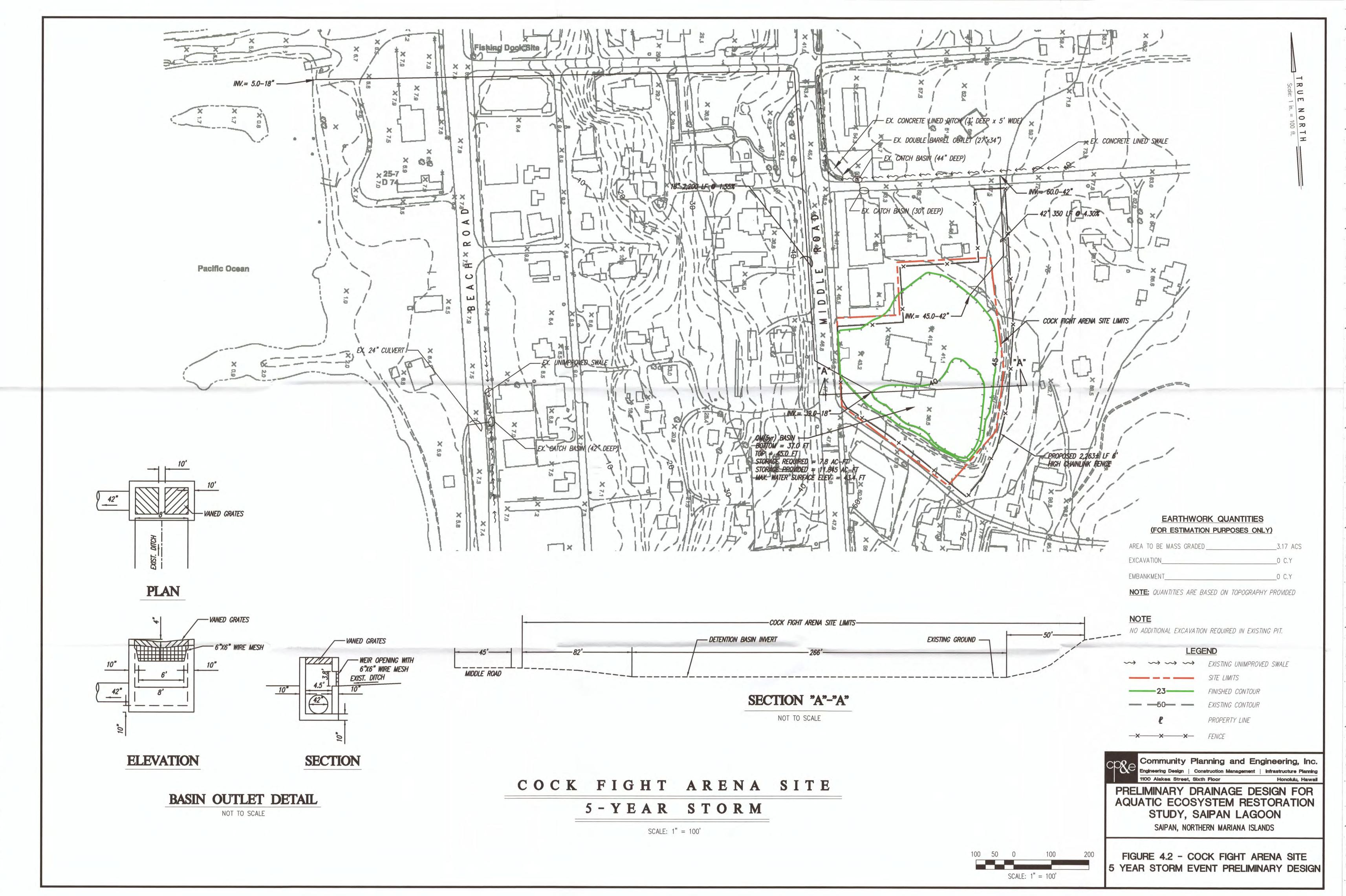
CHINA HOUSE SITE 10-YEAR STORM

SCALE: 1" = 100'

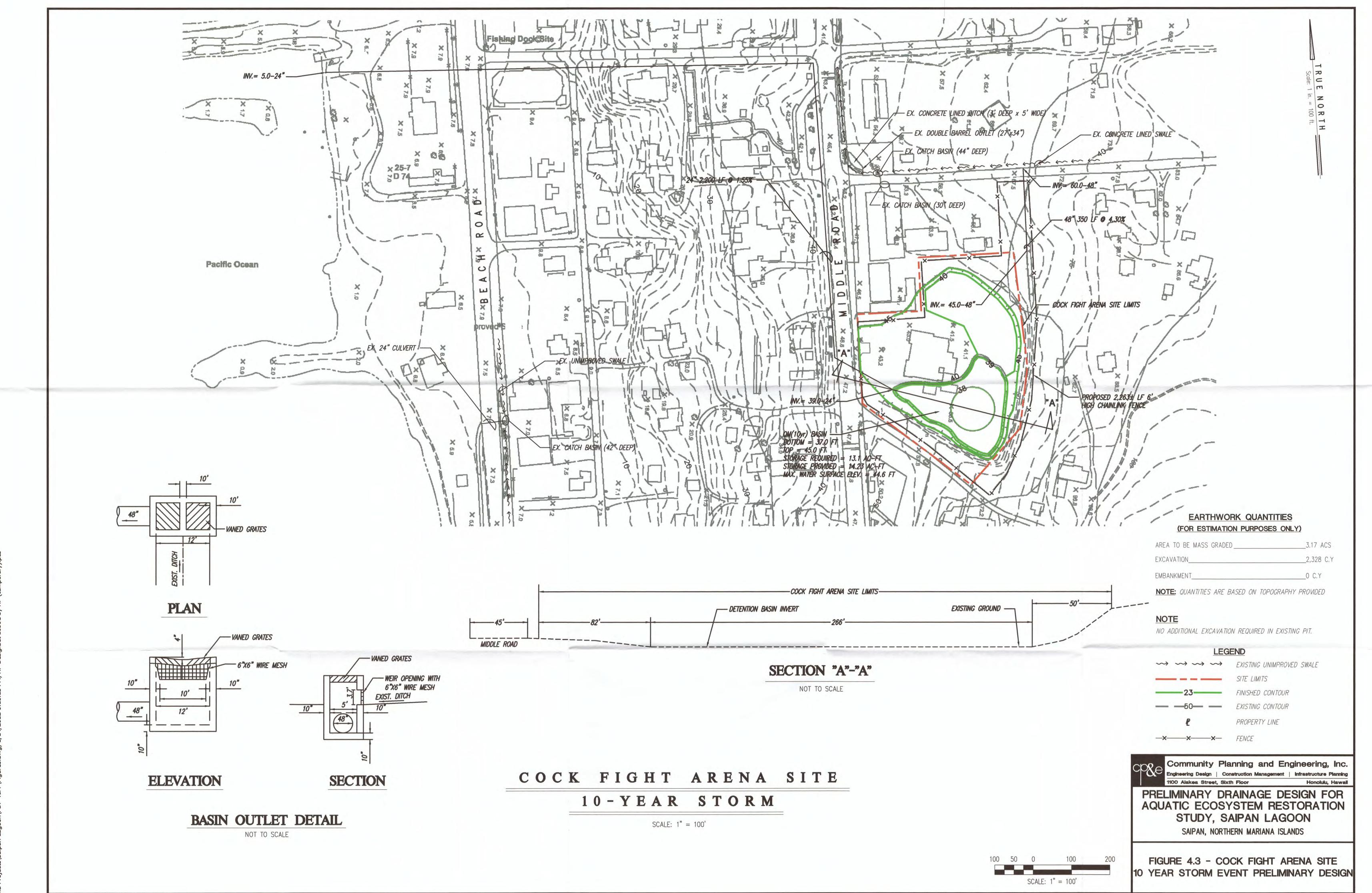




P:\Land Projects\Saipan Lagoon\PDF-TIFF\Figures.dwg, 1/14/2012 6:11:31 PM, HP DesignJet 105



P:\Land Projects\Saipan Lagoon\PDF-TIFF\Figures.dwg, 1/14/2012 6:17:45 PM, HP DesignJet



P:\Land Projects\Saipan Lagoon\PDF-TTFF\Figures.dwg. 1/14/2012 6:18:13 PM. HP Design 1et 1050C by HP (temporary).pc3

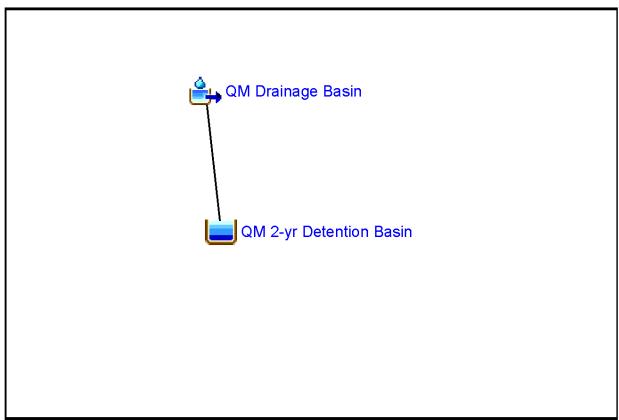
# Appendix A

# 1. Quartermaster Site: 2-Year Storm Event



## **Project: Saipon Lagoon Restoration**

Basin Model: Quarter Master 2-yr Storm Dec 27 14:11:52 HST 2011



# A. Quartermaster Drainage Basin:

#### A.1 Basin Model:

Area: 109 ac (0.1703 mi<sup>2</sup>)

CN: 65

Tc: 10.7 min Rainfall 2-year/1 hour: 1.93 in

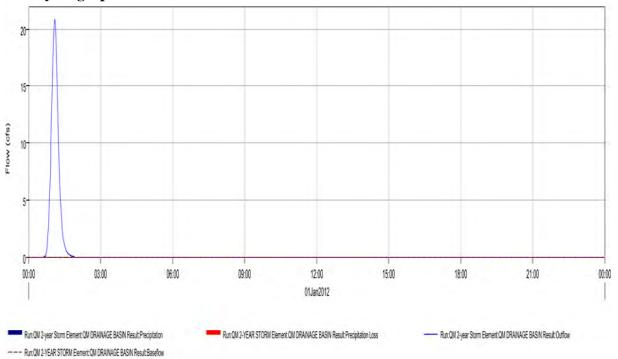
Loss Method: SCS Curve Number Transform Method: SCS Unit Hydrograph

#### **A.2 HEC-HMS Simulation Results:**

Simulation Run: QM 2-year Storm
Subbasin: QM Drainage Basin
Meteorologic Model: 2-year / 1 hour Storm
Control Specification: Control -24-hour

| Computed Results            |              |                             |             |
|-----------------------------|--------------|-----------------------------|-------------|
| Peak Discharge:             | 20.8 (cfs)   | Time of Peak Discharge:     | 01:06       |
| <b>Total Precipitation:</b> | 15.4 (ac-ft) | <b>Total Direct Runoff:</b> | 0.6 (ac-ft) |
| <b>Total Loss:</b>          | 14.8 (ac-ft) | Total Baseflow:             | 0.0 (ac-ft) |
| <b>Total Excess:</b>        | 0.6 (ac-ft)  | Discharge:                  | 0.6 (ac-ft) |

#### A3. Hydrograph



# **B. Quartermaster 2-Year Detention Basin:**

#### **B.1 Detention Basin Design:**

| Elevation (ft) | Surf. Area (ac) | Increment Storage (ac-ft) | Cumulative Storage (ac-ft) |
|----------------|-----------------|---------------------------|----------------------------|
| 23.00          | 0.050           | 0.000                     | 0.000                      |
| 24.00          | 0.090           | 0.070                     | 0.070                      |
| 25.00          | 0.110           | 0.100                     | 0.170                      |
| 26.00          | 0.130           | 0.120                     | 0.290                      |
| 28.00          | 0.180           | 0.310                     | 0.600                      |
| 30.00          | 0.230           | 0.410                     | 1.010                      |
| 32.00          | 0.280           | 0.510                     | 1.520                      |

#### **B.2 Outlet Design:**

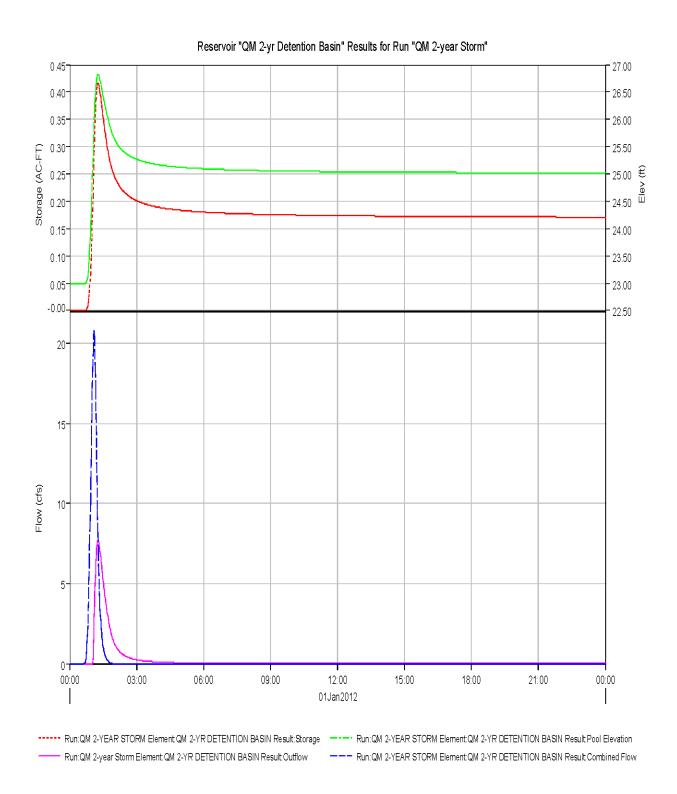
| Pipe:                 | RCP culvert (end-section conforming to fill) |
|-----------------------|----------------------------------------------|
| Diameter:             | 18 in                                        |
| Length:               | 100 ft                                       |
| Inlet Elevation:      | 25.00 ft                                     |
| Outlet Elevation:     | 24.00 ft                                     |
| Entrance Coefficient: | 0.500                                        |
| Slope:                | 0.010                                        |
| Outlet Coefficient:   | 0.900                                        |
| Mannings n:           | 0.013                                        |

#### **B.3 HEC-HMS Simulation:**

Simulation Run: QM 2-year Storm
Subbasin: QM Drainage Basin
Meteorologic Model: 2-year / 1 hour Storm
Control Specification: Control -24-hour

| Computed Results      |             |                       |             |
|-----------------------|-------------|-----------------------|-------------|
| Peak Inflow:          | 20.8 (cfs)  | Time of Peak Inflow:  | 01:06       |
| Peak Outflow:         | 7.7 (cfs)   | Time of Peak Outflow: | 01:16       |
| <b>Total Inflow:</b>  | 0.6 (ac-ft) | Peak Storage:         | 0.4 (ac-ft) |
| <b>Total Outflow:</b> | 0.4 (ac-ft) | Peak Elevation:       | 26.8 (ft)   |

#### **B.4 Hydrograph**

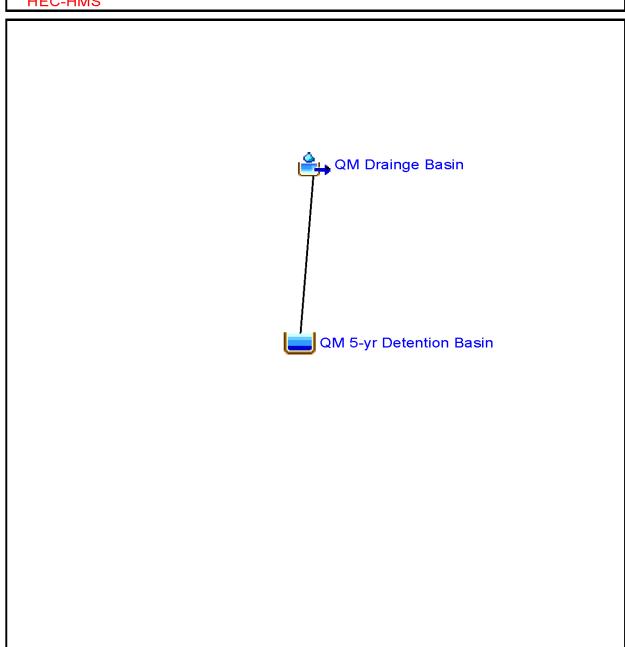


# 2. Quartermaster Site: 5-Year Storm Event



#### **Project: Saipon Lagoon Restoration**

Basin Model: Quarter Master 5-yr Storm Jan 12 07:57:36 HST 2012



# **C.Quartermaster Drainage Basin:**

#### A.1 Basin Model:

Area: 109 ac (0.1703 mi<sup>2</sup>)

CN: 65

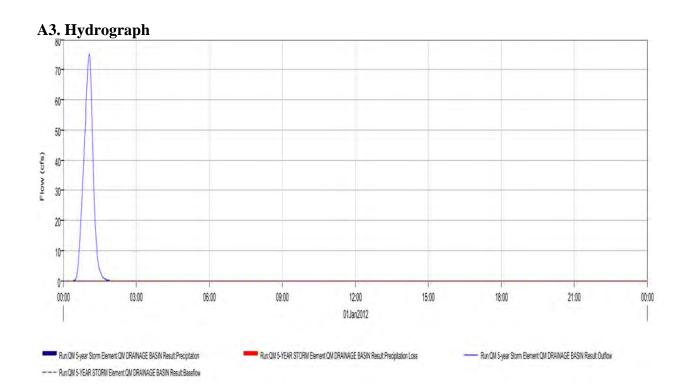
Tc: 10.7 min Rainfall 5-year/1 hour: 2.61 in

Loss Method: SCS Curve Number Transform Method: SCS Unit Hydrograph

#### **A.2 HEC-HMS Simulation Results:**

Simulation Run: QM 5-year Storm
Subbasin: QM Drainage Basin
Meteorologic Model: 5-year / 1 hour Storm
Control Specification: Control -24-hour

| Computed Results            |              |                             |             |
|-----------------------------|--------------|-----------------------------|-------------|
| Peak Discharge:             | 75.0 (cfs)   | Time of Peak Discharge:     | 01:04       |
| <b>Total Precipitation:</b> | 22.7 (ac-ft) | <b>Total Direct Runoff:</b> | 2.7 (ac-ft) |
| Total Loss:                 | 20.0 (ac-ft) | <b>Total Baseflow:</b>      | 0.0 (ac-ft) |
| <b>Total Excess:</b>        | 2.7 (ac-ft)  | Discharge:                  | 2.7 (ac-ft) |



# **D.Quartermaster 5-Year Detention Basin:**

#### **B.1 Detention Basin Design:**

| Elevation (ft) | Surf. Area (ac) | Increment Storage (ac-ft) | Cumulative Storage (ac-ft) |
|----------------|-----------------|---------------------------|----------------------------|
| 23.00          | 0.180           | 0.000                     | 0.000                      |
| 24.00          | 0.460           | 0.320                     | 0.320                      |
| 25.00          | 0.480           | 0.470                     | 0.790                      |
| 26.00          | 0.510           | 0.495                     | 1.285                      |
| 28.00          | 0.570           | 1.080                     | 2.365                      |
| 30.00          | 0.630           | 1.200                     | 3.565                      |
| 32.00          | 0.690           | 1.320                     | 4.885                      |

#### **B.2** Outlet Design:

| Pipe:                 | RCP culvert (end-section conforming to fill) |
|-----------------------|----------------------------------------------|
| Diameter:             | 18 in                                        |
| Length:               | 100 ft                                       |
| Inlet Elevation:      | 25.00 ft                                     |
| Outlet Elevation:     | 24.00 ft                                     |
| Entrance Coefficient: | 0.500                                        |
| Slope:                | 0.010                                        |
| Outlet Coefficient:   | 0.900                                        |
| Mannings n:           | 0.013                                        |

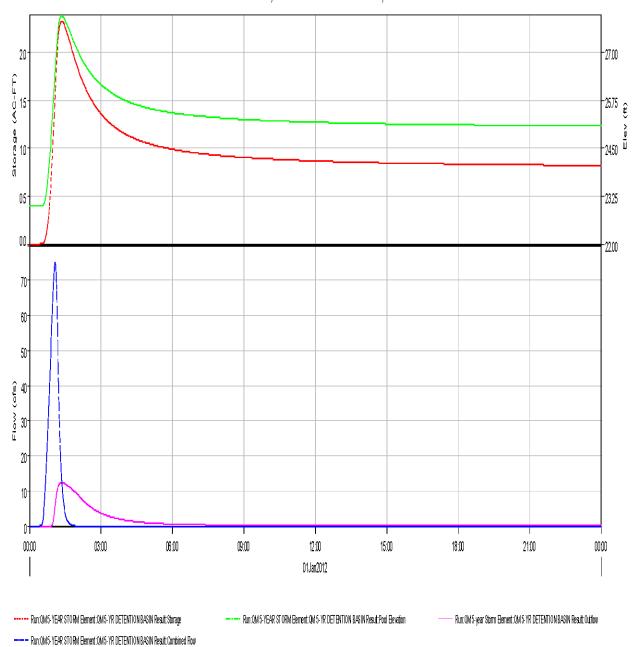
#### **B.3 HEC-HMS Simulation:**

Simulation Run: QM 5-year Storm
Subbasin: QM Drainage Basin
Meteorologic Model: 5-year / 1 hour Storm
Control Specification: Control -24-hour

| Computed Results      |                   |                        |             |
|-----------------------|-------------------|------------------------|-------------|
| Peak Inflow:          | 75.0 (cfs)        | Time of Peak Inflow:   | 01:04       |
| Peak Outflow:         | <b>12.4</b> (cfs) | Time of Peak Outflow:  | 01:21       |
| <b>Total Inflow:</b>  | 2.7 (ac-ft)       | Peak Storage:          | 2.3 (ac-ft) |
| <b>Total Outflow:</b> | 1.9 (ac-ft)       | <b>Peak Elevation:</b> | 27.9 (ft)   |

#### **B.4 Hydrograph**

Reservoir "QM 5-yr Detention Basin" Results for Run "QM 5-year Storm"

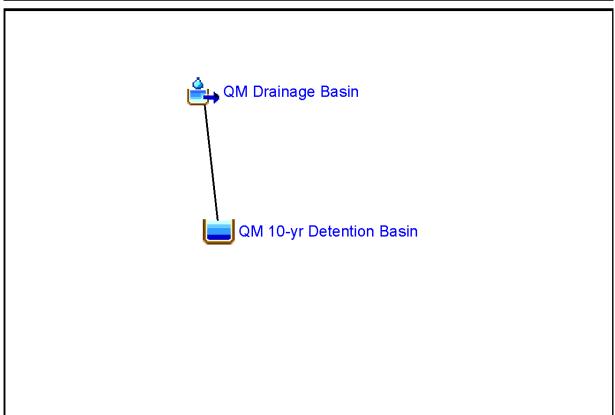


# 3. Quartermaster Site: 10-Year Storm Event



# **Project: Saipon Lagoon Restoration**

Basin Model: Quarter Master 10-yr Storm Dec 27 14:06:46 HST 2011



# A. Quartermaster Drainage Basin:

#### A.1 Basin Model:

Area: 109 ac (0.1703 mi<sup>2</sup>)

CN: 65

Tc: 10.7 min Rainfall 10-year/1 hour: 3.06 in

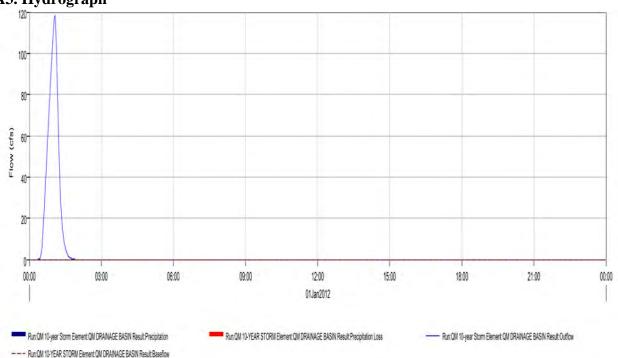
Loss Method: SCS Curve Number Transform Method: SCS Unit Hydrograph

#### **A.2 HEC-HMS Simulation Results:**

Simulation Run: QM 10-year Storm
Subbasin: QM Drainage Basin
Meteorologic Model: 10-year / 1 hour Storm
Control Specification: Control -24-hour

| Computed Results            |              |                             |             |
|-----------------------------|--------------|-----------------------------|-------------|
| Peak Discharge:             | 118.5 (cfs)  | Time of Peak Discharge:     | 01:04       |
| <b>Total Precipitation:</b> | 27.5 (ac-ft) | <b>Total Direct Runoff:</b> | 4.7 (ac-ft) |
| <b>Total Loss:</b>          | 22.8 (ac-ft) | Total Baseflow:             | 0.0 (ac-ft) |
| <b>Total Excess:</b>        | 4.7 (ac-ft)  | Discharge:                  | 4.7 (ac-ft) |

#### A3. Hydrograph



# **B. Quartermaster 10-Year Detention Basin:**

#### **B.1 Detention Basin Design:**

| Elevation (ft) | Surf. Area (ac) | Increment Storage (ac-ft) | Cumulative Storage (ac-ft) |
|----------------|-----------------|---------------------------|----------------------------|
| 23.00          | 0.180           | 0.000                     | 0.000                      |
| 24.00          | 0.680           | 0.430                     | 0.430                      |
| 25.00          | 0.710           | 0.695                     | 1.125                      |
| 26.00          | 0.740           | 0.725                     | 1.850                      |
| 28.00          | 0.810           | 1.550                     | 3.400                      |
| 30.00          | 0.880           | 1.690                     | 5.090                      |
| 32.00          | 0.950           | 1.830                     | 6.920                      |

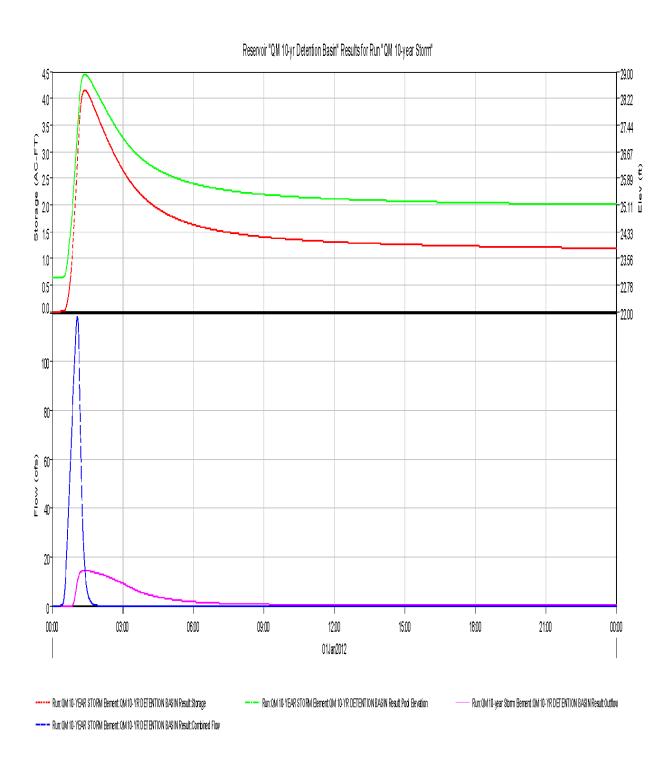
#### **B.2 Outlet Design:**

| Pipe:                 | RCP culvert (end-section conforming to fill) |  |
|-----------------------|----------------------------------------------|--|
| Diameter:             | 18 in                                        |  |
| Length:               | 100 ft                                       |  |
| Inlet Elevation:      | 25.00 ft                                     |  |
| Outlet Elevation:     | 24.00 ft                                     |  |
| Entrance Coefficient: | 0.500                                        |  |
| Slope:                | 0.010                                        |  |
| Outlet Coefficient:   | 0.900                                        |  |
| Mannings n:           | 0.013                                        |  |

#### **B.3 HEC-HMS Simulation:**

Simulation Run: QM 10-year Storm
Subbasin: QM Drainage Basin
Meteorologic Model: 10-year / 1 hour Storm
Control Specification: Control -24-hour

| Computed Results      |             |                       |             |
|-----------------------|-------------|-----------------------|-------------|
| Peak Inflow:          | 118.5 (cfs) | Time of Peak Inflow:  | 01:04       |
| Peak Outflow:         | 14.5 (cfs)  | Time of Peak Outflow: | 01:23       |
| <b>Total Inflow:</b>  | 4.7 (ac-ft) | Peak Storage:         | 4.2 (ac-ft) |
| <b>Total Outflow:</b> | 3.5 (ac-ft) | Peak Elevation:       | 28.9 (ft)   |

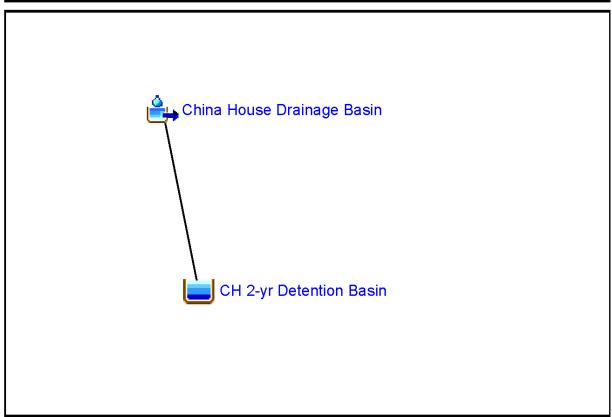


# 4. China House Site: 2-Year Storm Event



## **Project: Saipon Lagoon Restoration**

Basin Model: China House 2-yr Storm Dec 27 13:50:14 HST 2011



## **A.China House Drainage Basin:**

### A.1 Basin Model:

344 ac (0.5375 mi<sup>2</sup>) Area:

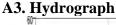
CN: 68 Tc: 28.2 min Rainfall 2-year/1 hour: 1.93 in

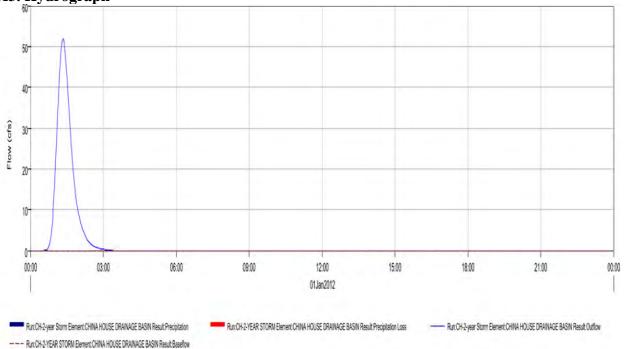
Loss Method: SCS Curve Number Transform Method: SCS Unit Hydrograph

### **A.2 HEC-HMS Simulation Results:**

Simulation Run: CH 2-year Storm Subbasin: CH Drainage Basin 2-year / 1 hour Storm Meteorologic Model: Control Specification: Control -24-hour

| Computed Results            |                   |                             |             |
|-----------------------------|-------------------|-----------------------------|-------------|
| Peak Discharge:             | <b>51.9</b> (cfs) | Time of Peak Discharge:     | 01:20       |
| <b>Total Precipitation:</b> | 48.6 (ac-ft)      | <b>Total Direct Runoff:</b> | 3.0 (ac-ft) |
| <b>Total Loss:</b>          | 45.6 (ac-ft)      | <b>Total Baseflow:</b>      | 0.0 (ac-ft) |
| <b>Total Excess:</b>        | 3.0 (ac-ft)       | Discharge:                  | 3.0 (ac-ft) |





## **B. China House 2-Year Detention Basin:**

### **B.1 Detention Basin Design:**

| Elevation (ft) | Surf. Area (ac) | Increment Storage (ac-ft) | Cumulative Storage (ac-ft) |
|----------------|-----------------|---------------------------|----------------------------|
| 20.00          | 0.190           | 0.000                     | 0.000                      |
| 21.00          | 0.450           | 0.320                     | 0.320                      |
| 22.00          | 0.470           | 0.460                     | 0.780                      |
| 24.00          | 0.530           | 1.000                     | 1.780                      |
| 26.00          | 0.580           | 1.110                     | 2.890                      |
| 28.00          | 0.640           | 1.220                     | 4.110                      |
| 29.00          | 0.670           | 0.655                     | 4.765                      |

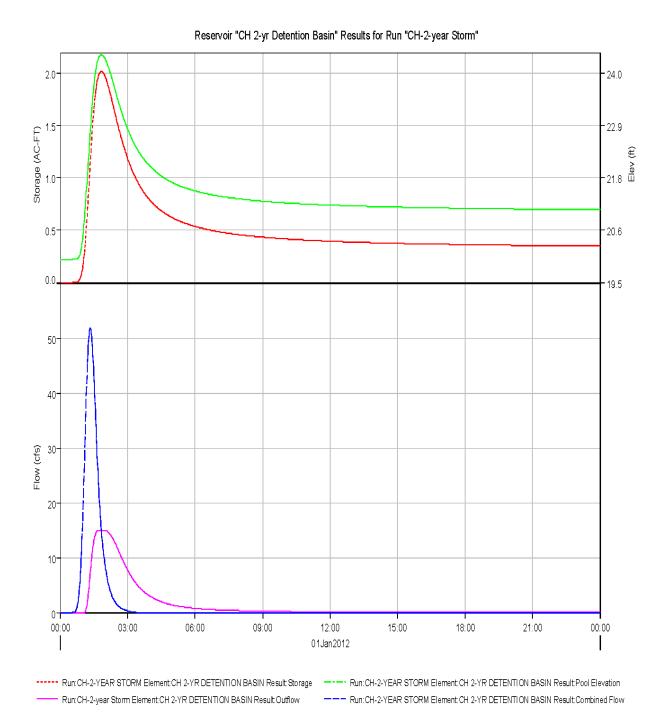
### **B.2 Outlet Design:**

| Pipe:                 | RCP culvert (end-section conforming to fill) |
|-----------------------|----------------------------------------------|
| Diameter:             | 18 in                                        |
| Length:               | 750 ft                                       |
| Inlet Elevation:      | 21.00 ft                                     |
| Outlet Elevation:     | 7.00 ft                                      |
| Entrance Coefficient: | 0.500                                        |
| Slope:                | 0.0187                                       |
| Outlet Coefficient:   | 0.900                                        |
| Mannings n:           | 0.013                                        |

### **B.3 HEC-HMS Simulation:**

Simulation Run: CH 2-year Storm
Subbasin: CH Drainage Basin
Meteorologic Model: 2-year / 1 hour Storm
Control Specification: Control -24-hour

| Computed Results      |             |                       |             |
|-----------------------|-------------|-----------------------|-------------|
| Peak Inflow:          | 51.9 (cfs)  | Time of Peak Inflow:  | 01:20       |
| Peak Outflow:         | 15.0 (cfs)  | Time of Peak Outflow: | 02:01       |
| <b>Total Inflow:</b>  | 3.0 (ac-ft) | Peak Storage:         | 2.0 (ac-ft) |
| <b>Total Outflow:</b> | 2.6 (ac-ft) | Peak Elevation:       | 24.4 (ft)   |

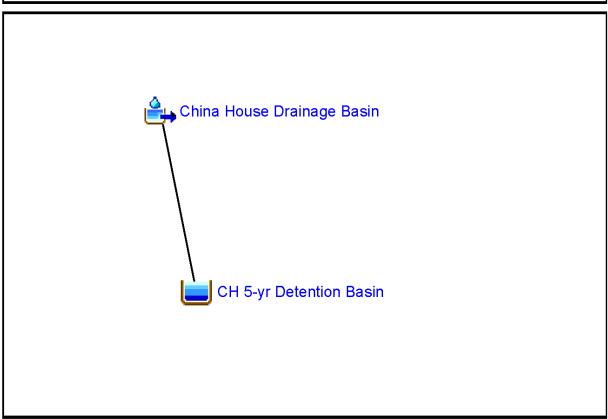


## 5. China House Site: 5-Year Storm Event



## **Project: Saipon Lagoon Restoration**

Basin Model: China House 5-yr Storm Dec 27 14:05:08 HST 2011



## **A.China House Drainage Basin:**

### A.1 Basin Model:

Area: 344 ac (0.5375 mi<sup>2</sup>)

CN: 68

Tc: 28.2 min Rainfall 5-year/1 hour: 2.61 in

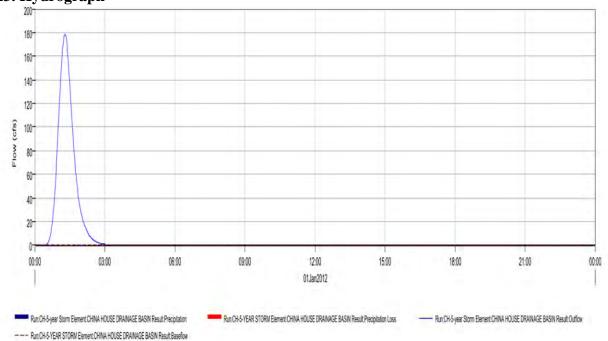
Loss Method: SCS Curve Number Transform Method: SCS Unit Hydrograph

### **A.2 HEC-HMS Simulation Results:**

Simulation Run: CH 5-year Storm
Subbasin: CH Drainage Basin
Meteorologic Model: 5-year / 1 hour Storm
Control Specification: Control -24-hour

| Computed Results            |              |                             |              |
|-----------------------------|--------------|-----------------------------|--------------|
| Peak Discharge:             | 178.6 (cfs)  | Time of Peak Discharge:     | 01:17        |
| <b>Total Precipitation:</b> | 71.6 (ac-ft) | <b>Total Direct Runoff:</b> | 11.1 (ac-ft) |
| <b>Total Loss:</b>          | 60.5 (ac-ft) | <b>Total Baseflow:</b>      | 0.0 (ac-ft)  |
| <b>Total Excess:</b>        | 11.1 (ac-ft) | Discharge:                  | 11.1 (ac-ft) |

### A3. Hydrograph



## **B. China House 5-Year Detention Basin:**

### **B.1 Detention Basin Design:**

| Elevation (ft) | Surf. Area (ac) | Increment Storage (ac-ft) | Cumulative Storage (ac-ft) |
|----------------|-----------------|---------------------------|----------------------------|
| 19.00          | 0.190           | 0.000                     | 0.000                      |
| 20.00          | 0.740           | 0.465                     | 0.465                      |
| 21.00          | 1.310           | 1.025                     | 1.490                      |
| 22.00          | 1.360           | 1.335                     | 2.825                      |
| 24.00          | 1.450           | 2.810                     | 5.635                      |
| 26.00          | 1.550           | 3.000                     | 8.635                      |
| 28.00          | 1.650           | 3.200                     | 11.835                     |
| 29.00          | 1.760           | 1.705                     | 13.540                     |

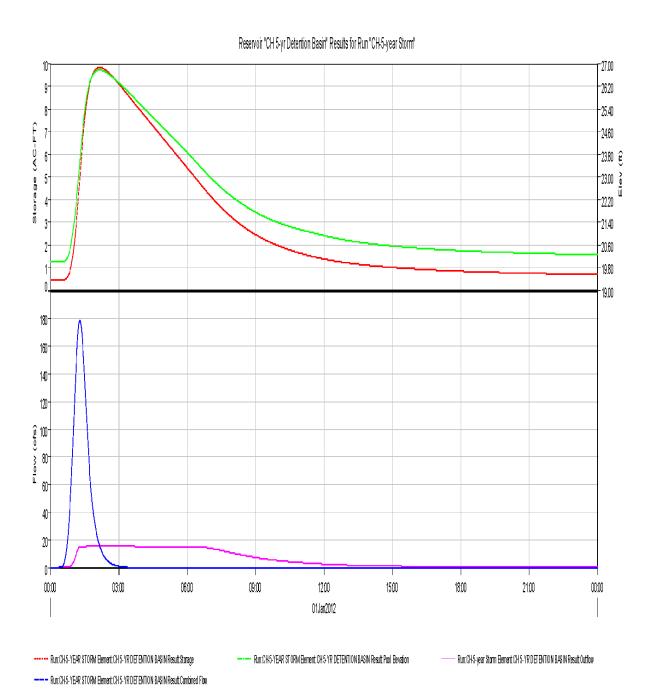
### **B.2 Outlet Design:**

| Pipe:                 | RCP culvert (end-section conforming to fill) |
|-----------------------|----------------------------------------------|
| Diameter:             | 18 in                                        |
| Length:               | 750 ft                                       |
| Inlet Elevation:      | 20.00 ft                                     |
| Outlet Elevation:     | 7.00 ft                                      |
| Entrance Coefficient: | 0.500                                        |
| Slope:                | 0.0173                                       |
| Outlet Coefficient:   | 0.900                                        |
| Mannings n:           | 0.013                                        |

### **B.3 HEC-HMS Simulation:**

Simulation Run: CH 5-year Storm
Subbasin: CH Drainage Basin
Meteorologic Model: 5-year / 1 hour Storm
Control Specification: Control -24-hour

| Computed Results      |              |                       |             |
|-----------------------|--------------|-----------------------|-------------|
| Peak Inflow:          | 178.6 (cfs)  | Time of Peak Inflow:  | 01:17       |
| Peak Outflow:         | 15.6 (cfs)   | Time of Peak Outflow: | 02:09       |
| <b>Total Inflow:</b>  | 11.1 (ac-ft) | Peak Storage:         | 9.8 (ac-ft) |
| <b>Total Outflow:</b> | 10.9 (ac-ft) | Peak Elevation:       | 26.8 (ft)   |

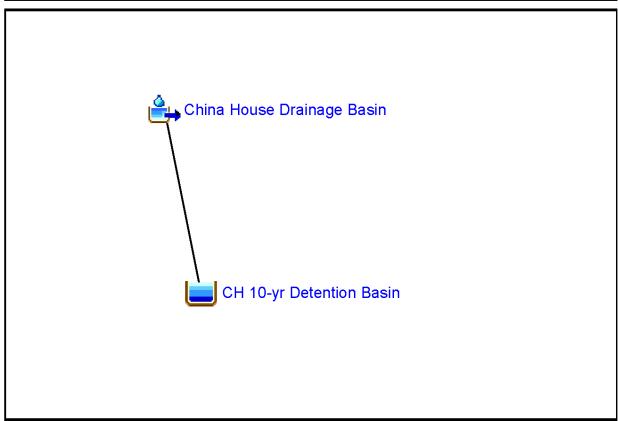


## 6. China House Site: 10-Year Storm Event



## **Project: Saipon Lagoon Restoration**

Basin Model: China House 10-yr Storm Dec 27 11:56:18 HST 2011



## A. China House Drainage Basin:

### A.1 Basin Model:

Area: 344 ac (0.5375 mi<sup>2</sup>)

CN: 68

Tc: 28.2 min Rainfall 10-year/1 hour: 3.06 in

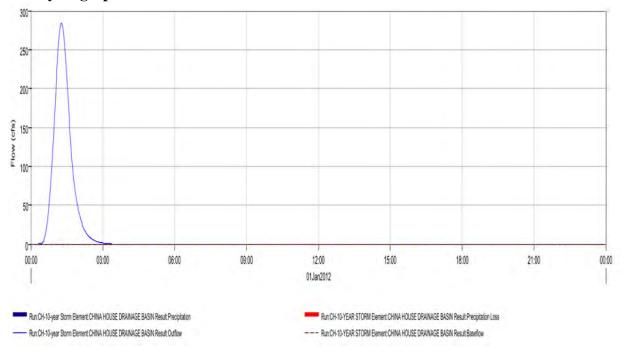
Loss Method: SCS Curve Number Transform Method: SCS Unit Hydrograph

### **A.2 HEC-HMS Simulation Results:**

Simulation Run: CH 10-year Storm
Subbasin: CH Drainage Basin
Meteorologic Model: 10-year / 1 hour Storm
Control Specification: Control -24-hour

| Computed Results     |              |                             |              |
|----------------------|--------------|-----------------------------|--------------|
| Peak Discharge:      | 284.0 (cfs)  | Time of Peak Discharge:     | 01:17        |
| Total Precipitation: | 86.6 (ac-ft) | <b>Total Direct Runoff:</b> | 18.3 (ac-ft) |
| <b>Total Loss:</b>   | 68.3 (ac-ft) | Total Baseflow:             | 0.0 (ac-ft)  |
| <b>Total Excess:</b> | 18.3 (ac-ft) | Discharge:                  | 18.3 (ac-ft) |

### A3. Hydrograph



## **B. China House 10-Year Detention Basin:**

### **B.1 Detention Basin Design:**

| Elevation (ft) | Surf. Area (ac) | Increment Storage (ac-ft) | Cumulative Storage (ac-ft) |
|----------------|-----------------|---------------------------|----------------------------|
| 18.00          | 0.001           | 0.000                     | 0.000                      |
| 19.00          | 0.191           | 0.096                     | 0.096                      |
| 20.00          | 0.743           | 0.467                     | 0.563                      |
| 21.00          | 1.312           | 1.028                     | 1.590                      |
| 22.00          | 1.412           | 1.362                     | 2.953                      |
| 24.00          | 1.509           | 2.921                     | 5.873                      |
| 26.00          | 1.609           | 3.118                     | 8.992                      |
| 28.00          | 1.711           | 3.320                     | 12.312                     |
| 29.00          | 1.764           | 1.737                     | 14.049                     |
| 30.00          | 1.817           | 1.790                     | 15.839                     |

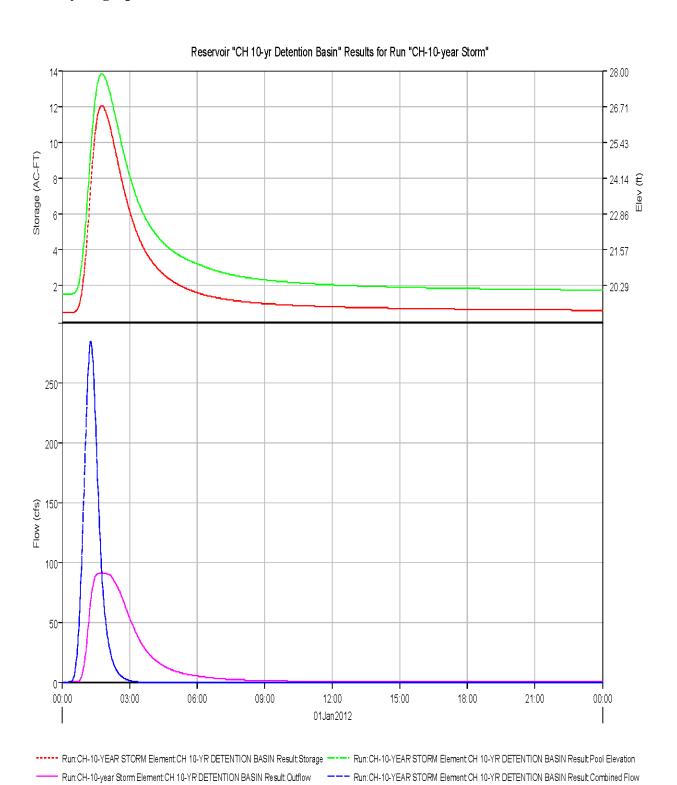
### **B.2 Outlet Design:**

| Pipe:                 | RCP culvert (end-section conforming to fill) |
|-----------------------|----------------------------------------------|
| Diameter:             | 36 in                                        |
| Length:               | 750 ft                                       |
| Inlet Elevation:      | 20.00 ft                                     |
| Outlet Elevation:     | 7.00 ft                                      |
| Entrance Coefficient: | 0.500                                        |
| Slope:                | 0.0173                                       |
| Outlet Coefficient:   | 0.900                                        |
| Mannings n:           | 0.013                                        |

### **B.3 HEC-HMS Simulation:**

Simulation Run: CH 10-year Storm
Subbasin: CH Drainage Basin
Meteorologic Model: 10-year / 1 hour Storm
Control Specification: Control -24-hour

| Computed Results      |              |                       |              |
|-----------------------|--------------|-----------------------|--------------|
| Peak Inflow:          | 284.0 (cfs)  | Time of Peak Inflow:  | 01:17        |
| Peak Outflow:         | 91.1 (cfs)   | Time of Peak Outflow: | 01:46        |
| <b>Total Inflow:</b>  | 18.3 (ac-ft) | Peak Storage:         | 12.0 (ac-ft) |
| <b>Total Outflow:</b> | 18.1 (ac-ft) | Peak Elevation:       | 27.9 (ft)    |

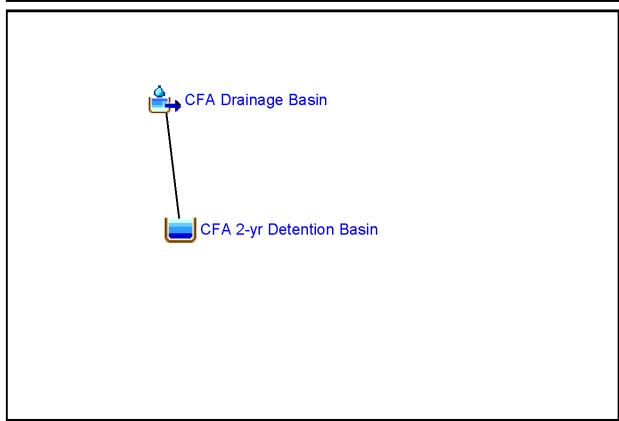


# 7. Cock Fight Arena Site: 2-Year Storm Event



## **Project: Saipon Lagoon Restoration**

Basin Model: Cock Fight Arena 2-yr Storm Dec 27 14:28:22 HST 2011



## A.Cock Fight Arena Drainage Basin:

### A.1 Basin Model:

Area: 412.69 ac (0.6448 mi<sup>2</sup>)

CN: 65

Tc: 55.2 min Rainfall 2-year/1 hour: 1.93 in

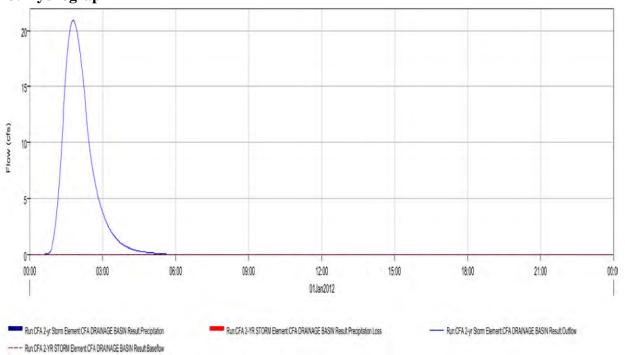
Loss Method: SCS Curve Number Transform Method: SCS Unit Hydrograph

### **A.2 HEC-HMS Simulation Results:**

Simulation Run: CFA 2-year Storm
Subbasin: CFA Drainage Basin
Meteorologic Model: 2-year / 1 hour Storm
Control Specification: Control -24-hour

| Computed Results            |                     |                             |             |
|-----------------------------|---------------------|-----------------------------|-------------|
| Peak Discharge:             | 20.9 (cfs)          | Time of Peak Discharge:     | 01:48       |
| <b>Total Precipitation:</b> | 58.2 (ac-ft)        | <b>Total Direct Runoff:</b> | 2.2 (ac-ft) |
| <b>Total Loss:</b>          | <b>56.0</b> (ac-ft) | Total Baseflow:             | 0.0 (ac-ft) |
| <b>Total Excess:</b>        | 2.2 (ac-ft)         | Discharge:                  | 2.2 (ac-ft) |

### A3. Hydrograph



## **B.** Cock Fight Arena 2-Year Detention Basin:

### **B.1 Detention Basin Design:**

| Elevation (ft) | Surf. Area (ac) | Increment Storage (ac-ft) | Cumulative Storage (ac-ft) |
|----------------|-----------------|---------------------------|----------------------------|
| 37.00          | 0.010           | 0.000                     | 0.000                      |
| 40.00          | 0.970           | 1.470                     | 1.470                      |
| 45.00          | 3.180           | 10.375                    | 11.845                     |

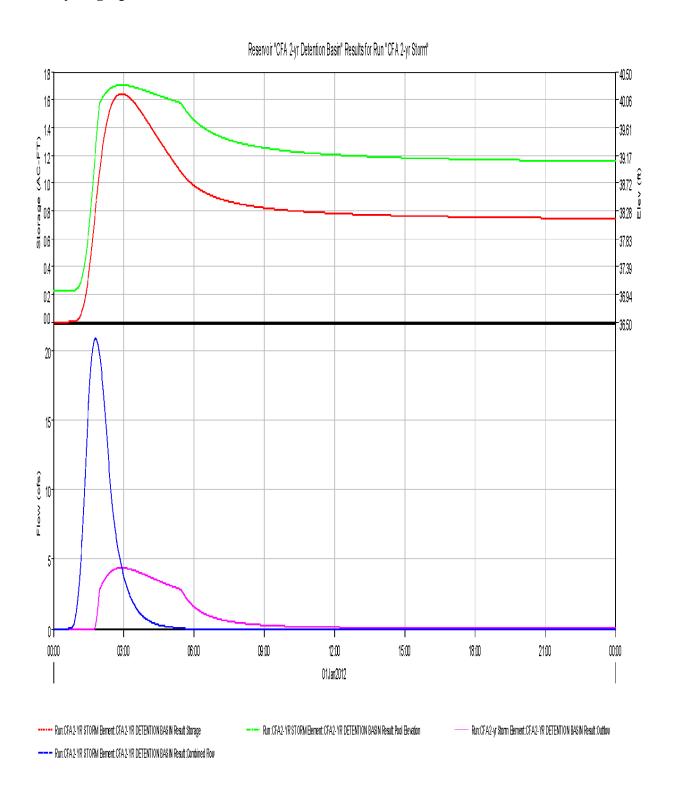
### **B.2 Outlet Design:**

| Pipe:                 | RCP culvert (end-section conforming to fill) |
|-----------------------|----------------------------------------------|
| Diameter:             | 18 in                                        |
| Length:               | 2,200 ft                                     |
| Inlet Elevation:      | 39.00 ft                                     |
| Outlet Elevation:     | 7.00 ft                                      |
| Entrance Coefficient: | 0.500                                        |
| Slope:                | 0.0155                                       |
| Outlet Coefficient:   | 0.900                                        |
| Mannings n:           | 0.013                                        |

### **B.3 HEC-HMS Simulation:**

Simulation Run: CFA 2-year Storm
Subbasin: CFA Drainage Basin
Meteorologic Model: 2-year / 1 hour Storm
Control Specification: Control -24-hour

| Computed Results      |                  |                       |             |
|-----------------------|------------------|-----------------------|-------------|
| Peak Inflow:          | 20.9 (cfs)       | Time of Peak Inflow:  | 01:48       |
| Peak Outflow:         | <b>4.4</b> (cfs) | Time of Peak Outflow: | 02:55       |
| <b>Total Inflow:</b>  | 2.2 (ac-ft)      | Peak Storage:         | 1.6 (ac-ft) |
| <b>Total Outflow:</b> | 1.4 (ac-ft)      | Peak Elevation:       | 40.3 (ft)   |

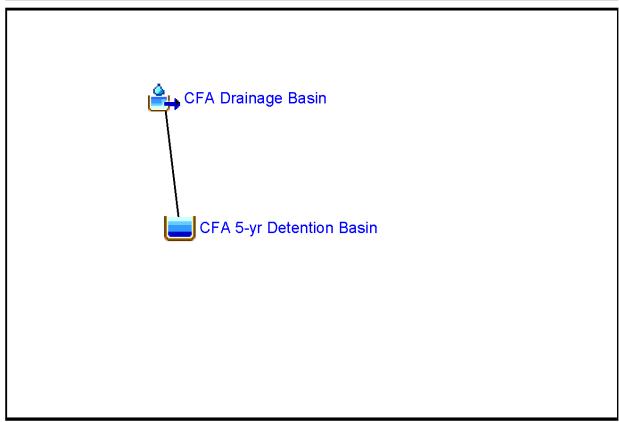


# 8. Cock Fight Arena Site: 5-Year Storm Event



## **Project: Saipon Lagoon Restoration**

Basin Model: Cock Fight Arena 5-yr Storm Dec 27 13:39:27 HST 2011



## A. Cock Fight Arena Drainage Basin:

### A.1 Basin Model:

Area: 412.69 ac (0.6448 mi<sup>2</sup>)

CN: 65

Tc: 55.2 min Rainfall 5-year/1 hour: 2.61 in

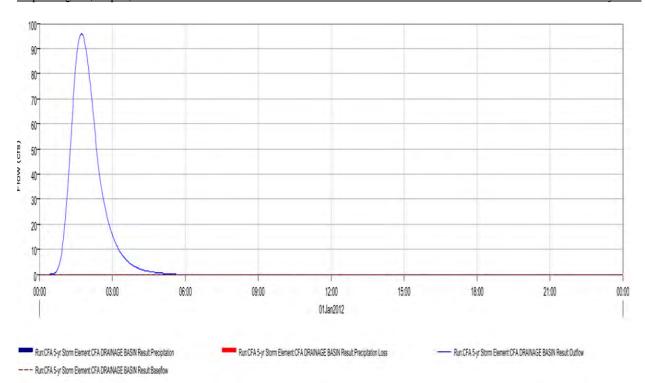
Loss Method: SCS Curve Number Transform Method: SCS Unit Hydrograph

### **A.2 HEC-HMS Simulation Results:**

Simulation Run: CFA 5-year Storm
Subbasin: CFA Drainage Basin
Meteorologic Model: 5-year / 1 hour Storm
Control Specification: Control -24-hour

| Computed Results            |              |                             |              |
|-----------------------------|--------------|-----------------------------|--------------|
| Peak Discharge:             | 95.9 (cfs)   | Time of Peak Discharge:     | 01:44        |
| <b>Total Precipitation:</b> | 85.9 (ac-ft) | <b>Total Direct Runoff:</b> | 10.2 (ac-ft) |
| Total Loss:                 | 75.7 (ac-ft) | Total Baseflow:             | 0.0 (ac-ft)  |
| <b>Total Excess:</b>        | 10.2 (ac-ft) | Discharge:                  | 10.2 (ac-ft) |

### A3. Hydrograph



## **B. Cock Fight Arena 5-Year Detention Basin:**

### **B.1 Detention Basin Design:**

| Elevation (ft) | Surf. Area (ac) | Increment Storage (ac-ft) | Cumulative Storage (ac-ft) |
|----------------|-----------------|---------------------------|----------------------------|
| 37.00          | 0.010           | 0.000                     | 0.000                      |
| 40.00          | 0.970           | 1.470                     | 1.470                      |
| 45.00          | 3.180           | 10.375                    | 11.845                     |

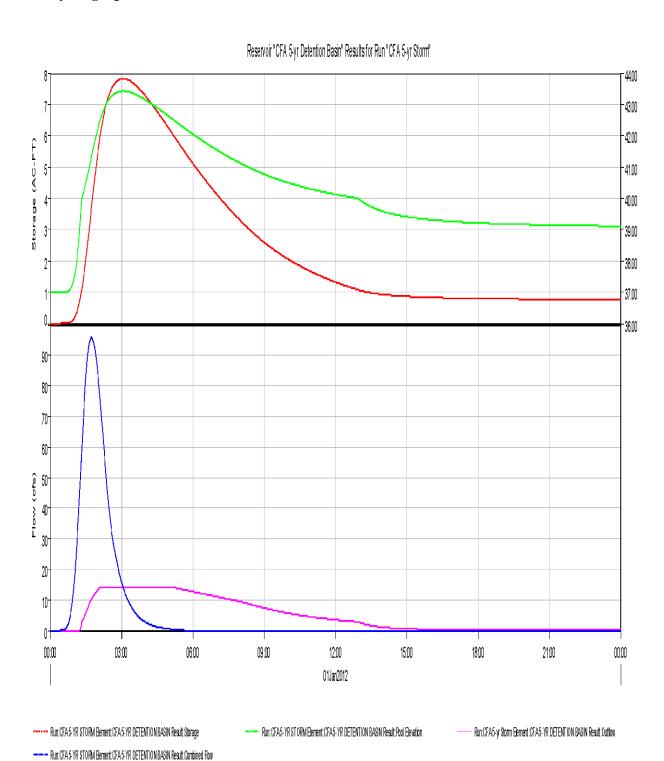
### **B.2 Outlet Design:**

| Pipe:                 | RCP culvert (end-section conforming to fill) |
|-----------------------|----------------------------------------------|
| Diameter:             | 18 in                                        |
| Length:               | 2,200 ft                                     |
| Inlet Elevation:      | 39.00 ft                                     |
| Outlet Elevation:     | 7.00 ft                                      |
| Entrance Coefficient: | 0.500                                        |
| Slope:                | 0.0155                                       |
| Outlet Coefficient:   | 0.900                                        |
| Mannings n:           | 0.013                                        |

### **B.3 HEC-HMS Simulation:**

Simulation Run: CFA 5-year Storm
Subbasin: CFA Drainage Basin
Meteorologic Model: 5-year / 1 hour Storm
Control Specification: Control -24-hour

| Computed Results      |              |                       |             |
|-----------------------|--------------|-----------------------|-------------|
| Peak Inflow:          | 95.9 (cfs)   | Time of Peak Inflow:  | 01:44       |
| Peak Outflow:         | 14.0 (cfs)   | Time of Peak Outflow: | 05:01       |
| <b>Total Inflow:</b>  | 10.2 (ac-ft) | Peak Storage:         | 7.8 (ac-ft) |
| <b>Total Outflow:</b> | 9.4 (ac-ft)  | Peak Elevation:       | 43.4 (ft)   |



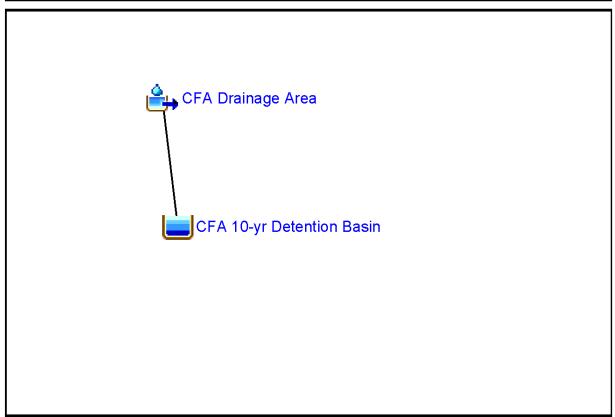
A-33

# 9. Cock Fight Arena Site: 10-Year Storm Event



## **Project: Saipon Lagoon Restoration**

Basin Model: Cock Fight Arena 10-yr Storm Dec 27 12:04:58 HST 2011



## A. Cock Fight Arena Drainage Basin:

### A.1 Basin Model:

Area: 412.69 ac (0.6448 mi<sup>2</sup>)

CN: 65
Tc: 55.2 min
Rainfall 10-year/1 hour: 3.06 in

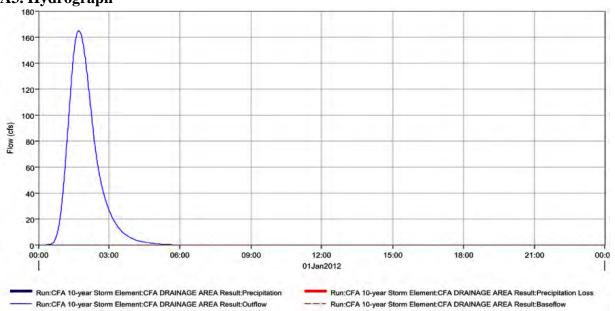
Loss Method: SCS Curve Number Transform Method: SCS Unit Hydrograph

### **A.2 HEC-HMS Simulation Results:**

Simulation Run: CFA 10-year Storm
Subbasin: CFA Drainage Basin
Meteorologic Model: 10-year / 1 hour Storm
Control Specification: Control -24-hour

| Computed Results            |               |                             |              |
|-----------------------------|---------------|-----------------------------|--------------|
| Peak Discharge:             | 164.7 (cfs)   | Time of Peak Discharge:     | 01:43        |
| <b>Total Precipitation:</b> | 103.8 (ac-ft) | <b>Total Direct Runoff:</b> | 17.7 (ac-ft) |
| Total Loss:                 | 86.1 (ac-ft)  | Total Baseflow:             | 0.0 (ac-ft)  |
| <b>Total Excess:</b>        | 17.7 (ac-ft)  | Discharge:                  | 17.7 (ac-ft) |

### A3. Hydrograph



## A.Cock Fight Arena 10-Year Detention Basin:

## **B.1 Detention Basin Design:**

| Elevation (ft) | Surf. Area (ac) | Increment Storage (ac-ft) | Cumulative Storage (ac-ft) |
|----------------|-----------------|---------------------------|----------------------------|
| 37.00          | 0.010           | 0.000                     | 0.000                      |
| 38.00          | 0.240           | 0.125                     | 0.125                      |
| 39.00          | 0.869           | 0.555                     | 0.680                      |
| 40.00          | 1.722           | 1.296                     | 1.975                      |
| 45.00          | 3.180           | 12.255                    | 14.230                     |

### **B.2 Outlet Design:**

| Pipe:                 | RCP culvert (end-section conforming to fill) |
|-----------------------|----------------------------------------------|
| Diameter:             | 24 in                                        |
| Length:               | 2,200 ft                                     |
| Inlet Elevation:      | 39.00 ft                                     |
| Outlet Elevation:     | 7.00 ft                                      |
| Entrance Coefficient: | 0.500                                        |
| Slope:                | 0.0155                                       |
| Outlet Coefficient:   | 0.900                                        |
| Mannings n:           | 0.013                                        |

### **B.3 HEC-HMS Simulation:**

Simulation Run: CFA 10-year Storm
Subbasin: CFA Drainage Basin
Meteorologic Model: 10-year / 1 hour Storm
Control Specification: Control -24-hour

| Computed Results      |                   |                        |              |
|-----------------------|-------------------|------------------------|--------------|
| Peak Inflow:          | 164.7 (cfs)       | Time of Peak Inflow:   | 01:43        |
| Peak Outflow:         | <b>30.3</b> (cfs) | Time of Peak Outflow:  | 03.55        |
| <b>Total Inflow:</b>  | 17.7 (ac-ft)      | Peak Storage:          | 13.1 (ac-ft) |
| <b>Total Outflow:</b> | 16.7 (ac-ft)      | <b>Peak Elevation:</b> | 44.6 (ft)    |

---- Rum CFA 10-YFAR STORM Hement CFA 10-YR DFTENTION RASIN Result Combined Flow

Reservoir "CFA 10-yr Detention Basin" Results for Run "CFA 10-year Storm" 45.00 43.71 -42.43 -41.14 € -39.86 <u>₩</u> -38.57 -37.29 36.00 180-140-120-100-00 - 00-(c) 80-40-20 00:00 03:00 0600 09:00 1200 15.00 18.00 21,00 00.00 01Jan2012 ------ Run:CFA 10-YEAR STORM Element:CFA 10-YR DETENTION BASIN Result:Storage ---- Run:CFA 10-YEAR STORM Bement:CFA 10-YR DETENTION BASIN Result:Pool Bevation Run:CFA 10-year Storm Element:CFA 10-YR DETENTION BASIN Result:Outflow

Appendix G Real Estate Planning Report

### **Real Estate Planning Report**

### **Section 206 Continuing Authorities Program**

# Aquatic Ecosystem Restoration Study Saipan Lagoon

Saipan, Commonwealth of Northern Marianas Islands

Prepared for Honolulu District, USACE

Prepared by
Jim Doing, Real Estate Appraiser, HQ, RAO
2 October 2012

## TABLE OF CONTENTS

|                                                | <u>Paragraph</u> | <u>Page</u> |
|------------------------------------------------|------------------|-------------|
| Executive Summary                              |                  | 3           |
| Authority/Purpose                              | 1                | 4           |
| Description                                    | 2                | 4           |
| Sponsor's Real Estate Interests                | 3                | 6           |
| Estates                                        |                  |             |
| Federal Projects/Ownership                     | 5                | 7           |
| Navigation Servitude                           |                  |             |
| Maps                                           | 7                | 8           |
| Flooding                                       | 8                | 8           |
| Baseline Cost Estimate                         | 9                | 8           |
| PL 91-646 Relocation Benefits                  | 10               | 10          |
| Minerals                                       | 11               | 10          |
| Assessment of Sponsor's Acquisition Capability | 12               | 10          |
| Zoning                                         | 13               | 10          |
| Milestones                                     |                  |             |
| Public Utilities Relocations                   | 15               | 11          |
| Environmental Impact                           | 16               | 11          |
| Attitude of Landowners                         | 17               | 11          |
| Notification of Sponsor                        | 18               | 11          |
| Addenda                                        |                  |             |
| Saipan Map                                     |                  | 13          |
| Project Area Map                               |                  | 14          |
| Cock Fight Aerial                              |                  | 15          |
| China House Aerial                             |                  | 16          |
| Quartermaster Road Aerial                      |                  | 17          |
| Cock Fight Arena Preliminary Design            |                  | 18          |
| China House Preliminary Design                 |                  | 18          |
| Quartermaster Road Preliminary Design          |                  | 19          |

#### **EXECUTIVE SUMMARY**

Numerous studies have been conducted throughout the island and the study area by various US agencies as well as the CNMI over the last few years. A phase I Aquatic Ecosystem Restoration study was conducted in June 2001 by Environet, Inc., under contract to USACE. A draft ERR was also prepared by the same company in June 2001, and they are currently working on a final ERR for 2012. The subject study is a continuing authorizes program authorized under section 206 of the Water Resources Development Act of 1996, and the purpose of this report is support the real estate requirements for a proposed project. At present the final alternative has not been defined and as such three alternative sites are valued with three flood frequency levels.

The study area involves approximately 2 miles of Lagoon along the west side of Saipan from about Fishing Base to Quartermaster Road. Three potential sites have been identified as well as the project features associated with those sites. The three sites from north to south are the Cock Fight Arena site, China House site, and Quartermaster Road site. Each site requires a retention basin and outlet works as the primary features. Two of the sites front on public roads and have readily available access for the project. China House site will require acquisition of adequate access. The specific route of this access has not been determined but has been estimated for planning purposes. A temporary staging area will be required and has been estimated for each site. There will be no requirement for disposal as this will be handled by a public land fill site.

The non-Federal sponsor is the CNMI government. They have not been assessed as to their acquisition capabilities but are believed to be fully capable. Per guidance, the CNMI will need to acquire the LERRD's for the project that they do not currently own. The estimated real estate costs for each of the sites is as follows:

Cock Fight Arena (all flood frequencies) = \$1,012,000 China House (all flood frequencies) = \$589,200 Quartermaster (2 year event) = \$431,000 (5 year event) = \$578,700 (10 year event) = \$817,700

The information provided in this report meets the requirements of EC 405-1-11.

#### 1. AUTHORITY/PURPOSE

The study is being investigated under the authority of Section 206 of the 1996 Water Resources Development Act (WRDA), as amended. Section 206 authorizes the Secretary of the Army to carry out a program of aquatic ecosystem restoration with the objective of restoring degraded ecosystem structure, function, and dynamic processes to a less degraded, more natural condition, considering the ecosystem's natural integrity, productivity, stability and biological diversity. This authority is primarily used for manipulation of the hydrology in and along bodies of water, including wetlands and riparian areas. It is a Continuing Authorities Program (CAP), which focuses on water resource related projects that are relatively small in terms of scope, cost and complexity.

The Commonwealth of Northern Marianas Islands (CNMI) has requested the assistance of USACE in determining a cost effective means to improve the aquatic ecosystem of the Saipan Lagoon from approximately the Fishing Base in Garapan to Quartermaster Road to the south. A phase I report has been prepared and an Environmental Restoration Report was originally prepared in 2007 and is currently being updated to 2012. Currently the study is in the Plan Formulation Stage in preparation of a selected NER plan for implementation.

This REPR will be included as a part of the Engineering Documentation Report and will be encompassed in the cost estimate for determination of the selected plan.

### 2. DESCRIPTION

The proposed project is located along an approximate 2 mile stretch of lagoon along the west side of Saipan from about Fishing Base to Quartermaster Road. The project area involves three low lying areas in the West Takapochao watershed; the cockfight arena site; the China House site and the Quartermaster Road site. These three sites encompass a large watershed drainage area in the mountains above the sites.

Middle Street provides the primary north/south access through the area and is a major traffic arterial. The cockfight arena site and the Quartermaster Road site front on Middle Street and the China House site is approximately mid was between Middle Street and Beach Road. The area is characterized as mixed urban and rural with commercial usage along Middle Street. The mountainous area above Middle Street is most undeveloped but with a scattering of residential development.

Climate is summarized as warm and humid and the study area has an average rainfall of 75 to 80 inches per year.

Topography is generally level to slightly sloping and all three sites tend to flood during heavy rainfall. Drainage is not well defined and most of the runoff is on the surface.

The ownerships impacted and required for acquisition of the fee interest for the three sites are as follows:

| <u>Parcel</u>                        | <u>Owner</u>                  | Area in Square Meters                     |                                         |                                          |
|--------------------------------------|-------------------------------|-------------------------------------------|-----------------------------------------|------------------------------------------|
| Cockfight Are                        | na Site:                      |                                           |                                         |                                          |
| 25-4<br>EA 693-2<br>078 D01<br>Total | Unknown<br>Unknown<br>Unknown | 10,080<br>1,140<br><u>5,378</u><br>16,598 |                                         |                                          |
| China House S                        | Site:                         |                                           |                                         |                                          |
| 1833                                 | Unknown                       | 12,550                                    |                                         |                                          |
| Quartermaste                         | er Road Site:                 | 2 YR.                                     | 5 YR.                                   | 10 YR.                                   |
| 1826-4<br>1826-R1<br>1822<br>Total   | Unknown<br>Unknown<br>Unknown | 1,507<br>2,000<br><u>946</u><br>4,453     | 1,507<br>3,780<br><u>2,000</u><br>7,287 | 1,507<br>6,113<br><u>2,500</u><br>10,120 |

Cockfight arena site is located just east of Middle Road and between Commonwealth Road and Japon Road. The property is improved with the cock fight arena, which is a large approximately 12,500 square foot structure which is in fair condition. It is a minimal functional building and will be acquired and demolished for the project. Parcel 078D01 is an entire acquisition and parcels 25-4 and EA 693-2 are a partial acquisitions. The remainders on the partial acquisition are of sufficient size and have adequate access to eliminate damages. In addition to the site itself, the preliminary plans call for approximately 2,200 lineal feet of 18" RCP for the diversion outlet flow.

China House site is located about midway between Middle Road and Beach Road. There is no direct public access to this property and it is unimproved. The acquisition will involve the entire ownership and there is no anticipated severance damage associated with the acquisition. This acquisition may involve two ownerships but the property is listed as one lot. There is an estimated 1,823 square meters of channel improvement easement required for the out-flow works. This site will also require permanent access, which is estimated from Middle Road and encompasses approximately 972 square meters.

Quartermaster Road site is located at the northwest corner of Middle Road and Quartermaster Road, and it has frontage on both roads. There are no improvements on this site. Parcel 1826-4 is an entire acquisition; parcel 1826-R1 is a partial acquisition of approximately half of the ownership in the 10 year event and the acquisition takes the Middle Street frontage. The remainder is damaged due to a loss of street frontage. Parcel 1822 is an acquisition of a small area of the ownership but it doesn't damage the remaining ownership. This site will require approximately 3,400 square meters for channel improvements to an existing swale.

All of the sites will require a temporary work area or staging area during construction. This has been estimated at approximately 2,024 square meters and is estimated for a one year construction period. This feature has been added to each alternative.

The China House site and Quartermaster Road site require excavation of material. Much of the material will be used on site for berms and the remaining excess will be disposed of in a public land fill. As such, there is no provision for a disposal LERRD requirement.

#### 3. SPONSOR'S REAL ESTATE INTERESTS

The sponsor owns or has owned various parcels in the area but the current extent is unknown. If the sponsor currently owns some of the parcels they will still receive credit for the market value of the land but will have no acquisition costs associated with that parcel. None of the parcels were acquired in anticipation of the proposed federal project.

#### 4. ESTATES TO BE ACQUIRED

#### Fee

The fee simple title to (the land described in Schedule A) (Tracts Nos. , and ), subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

#### TEMPORARY WORK AREA EASEMENT:

A temporary easement and right-of-way in, on, over and across (the land described in Schedule A) (Tracts Nos., and), for a period not to exceed\_\_\_\_\_\_, beginning with date possession of the land is granted to the United States, for use by the United States, its representatives, agents, and contractors as a (borrow area) (work area), including the right to borrow and/or deposit fill, spoil and waste material thereon). (move, store and remove equipment and supplies, and erect and. remove temporary \* structures on the land and to perform any other work necessary and incident to the construction of the

Project, together with the right to trim, cut, fell and remove, therefore all trees, underbrush, obstructions, and any other vegetation, structures, or obstacles within the limits of the right-of-way; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

### ROAD EASEMENT- PERPETUAL (std estate #11)

A perpetual and assignable easement and right-of-way in, on, over and across (the land described in Schedule A) (Tracts Nos. \_\_\_\_\_, \_\_\_\_, and \_\_\_\_\_) for the location, construction, operation, maintenance, alteration, replacement of (a) road(s) and appurtenances thereto; together with the right to trim, cut, fell and remove therefrom all trees, underbrush, obstructions and other vegetation, structures, or obstacles within the limits of the right-of-way; (reserving, however, to the owners, their heirs and assign, the right to cross over or under the right-of-way as access to their adjoining land at the locations indicated in Schedule B); 5/ subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

#### CHANNEL IMPROVEMENT EASEMENTS

A perpetual and assignable right and easement to construct, operate, and maintain channel improvement works on, over and across (the land described in Schedule A) (Tract Nos. \_\_\_, \_\_, and \_\_\_.) for the purposes as authorized by the Act of Congress approved \_\_\_\_\_, including the right to clear, cut, fell, remove and dispose of any and all timber, trees, underbrush, buildings, improvements and/or other obstructions therefore; to excavate dredge, cut away, and remove any or all of said land and to place thereon dredge or spoil material; and for such other purposes as may be required in connection with said work of improvement; reserving, however, to the owners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however, to existing easements for public roads and highways, public utilities, railroads and Pipelines.

#### 5. FEDERAL PROJECTS/OWNERSHIP

There are no federal projects or federal lands within the project area.

#### 6. NAVIGATION SERVITUDE

The project sites are all fast land parcels and navigation servitude does not apply to these lands.

### 7. MAPS

Maps depicting the territory of Saipan, the project areas and impacted parcels are attached in the addendum.

### 8. FLOODING

There are no flood plain maps available for the project area, but the subject parcels all experience surface flooding during periods of heavy rainfall.

### 9. BASELINE COST ESTIMATE FOR REAL ESTATE

### **Cock Fight Arena Site**

| Fee Title\$ 596,300                            |  |  |  |  |
|------------------------------------------------|--|--|--|--|
| Perpetual Channel Improvement Easement         |  |  |  |  |
| Perpetual Joint Use Road Easement\$0           |  |  |  |  |
| Temporary Work Area Easement                   |  |  |  |  |
| Improvements                                   |  |  |  |  |
| Hazard Removals\$0                             |  |  |  |  |
| Mineral Rights\$0                              |  |  |  |  |
| Damages\$0                                     |  |  |  |  |
| Incremental real estate costs                  |  |  |  |  |
| Relocations\$0                                 |  |  |  |  |
| Uniform Relocation Assistance (PL 91-646)\$ 0  |  |  |  |  |
| Acquisition Administrative Costs               |  |  |  |  |
| TOTAL COST\$ 1,012,000                         |  |  |  |  |
| China House Site                               |  |  |  |  |
| Fee Title\$ 401,600                            |  |  |  |  |
| Perpetual Channel Improvement Easement\$49,200 |  |  |  |  |

| Perpetual Joint Use Road Easement              |             | \$ 20,400    |
|------------------------------------------------|-------------|--------------|
| Temporary Work Area Easement                   |             | \$ 5,000     |
| Improvements                                   |             | \$ 0         |
| Hazard Removals                                |             | \$ 0         |
| Mineral Rights                                 |             | \$ 0         |
| Damages                                        |             | \$ 0         |
| Incremental real estate costs                  |             | \$ 88,000    |
| Relocations                                    |             | \$ 0         |
| Uniform Relocation Assistance (PL 91-646)      |             | \$ 0         |
| Acquisition Administrative Costs               |             | \$ 25,000    |
| TOTAL COST                                     |             | \$ 589,200   |
| Quartermaster Road S                           | Site        |              |
| <u>2YR.</u>                                    | <u>5YR.</u> | <u>10YR.</u> |
| Fee Title\$186,500                             | \$305,100   | \$423,700    |
| Perpetual Channel Improvement Easement\$93,500 | \$93,500    | \$93,500     |
| Perpetual Joint Use Road Easement\$0           | \$0         | \$0          |
| Temporary Work Area Easement\$5,000            | \$5,000     | \$5,000      |
| Improvements\$0                                | \$0         | \$0          |
| Hazard Removals\$0                             | \$0         | \$0          |
| Mineral Rights\$0                              | \$0         | \$0          |
| Damages\$0                                     | \$0         | \$90,000     |
| Incremental real estate costs\$71,000          | \$100,100   | \$130,500    |
| Relocations\$0                                 | \$0         | \$0          |

| Uniform Relocation Assistance (PL 91-6 | 46)\$0    | \$0       | \$0       |
|----------------------------------------|-----------|-----------|-----------|
| Acquisition Administrative Costs       | \$75,000  | \$75,000  | \$75,000  |
| TOTAL COST                             | \$431,000 | \$578,700 | \$817,700 |

#### 10. PL 91-646 RELOCATION BENEFITS

Public Law 91-646, The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, commonly called the Uniform Act, is the primary law for acquisition and relocation activities on Federal or federally assisted projects and programs. The local sponsor is required to follow the guidance in this public law.

The only property that has potential 91-646 benefits is the cock fight arena site. The arena is an operating business and will be acquired if that site is selected as the alternative. No allowance has been made for this business as it may not be acceptable in the law as a legal business, and as such may not be eligible for the benefit.

#### 11. MINERALS

There are no surface of subsurface minerals known that would impact the project or acquisition.

#### 12. ASSESSMENT OF SPONSOR'S ACQUISITION CAPABILITY

An assessment of the sponsor's acquisition capabilities to acquire the land necessary for this project has not been done. However, CNMI is considered fully capable.

#### 13. ZONING

There is no zoning available on the subject properties and no zoning on the island. The area is a mixture of urban and rural.

#### **14. MILESTONES**

The sponsor will begin preliminary acquisition work approximately 6 months prior to PPA execution as follows:

Survey/Maps/Title 90 Days

Legal Descriptions 30 Days Appraisals 90 Days

The sponsor will complete acquisition of LERRD within 180 days after the PPA execution as follows:

Documentation 120 Days
Negotiations 60 Days
Final Subdivision 60 Days
Payments 90 Days

LERRD certification 21 Days

#### 15. PUBLIC UTILITIES RELOCATIONS

There are no known public utilities that are impacted by the project.

#### **16. ENVIRONMENTAL IMPACTS**

Environmental impacts, if any, are discussed in other sections of the Engineering Documentation Report.

#### 17. ATTITUDES OF LANDOWNWERS

No information has been given as to public opinion about the project. To the extent that some local flooding will be reduced and the lagoon ecosystem will be improved, the project should be favorable.

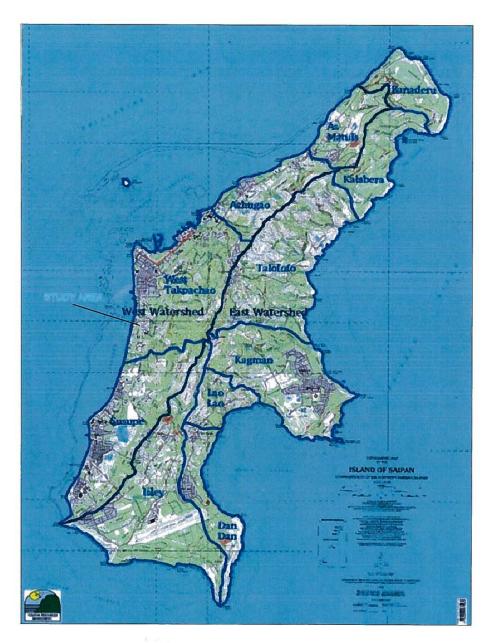
#### **18. NOTIFICATION TO SPONSOR**

The non-Federal sponsor, CNMI, is fully involved in the planning process although they have not been formally notified about the risks of acquiring the LERRD for the project prior to the PPA execution and the Government's formal notice to proceed. The written notice will be given once the final alternative is determined.

#### **ADDENDUM**

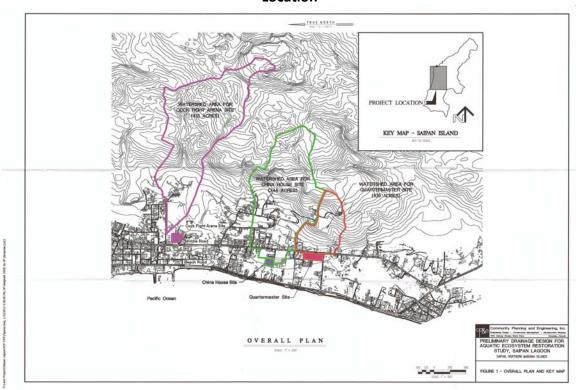
Saipan Map
Project Location Map
Cock Fight Arena Aerial
China House Aerial
Quartermaster Road Aerial
Cock Fight Arena Preliminary Design
China House Preliminary Design
Quartermaster Road Preliminary Design

### Saipan Map

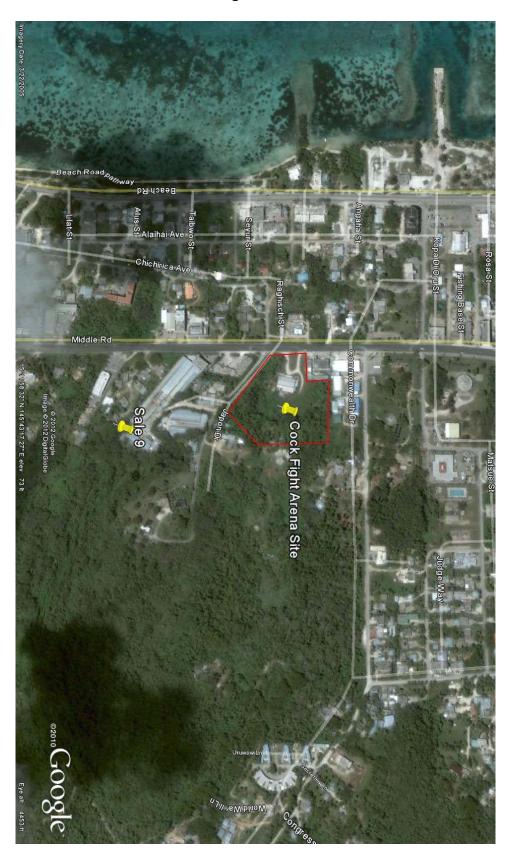




#### Project Location



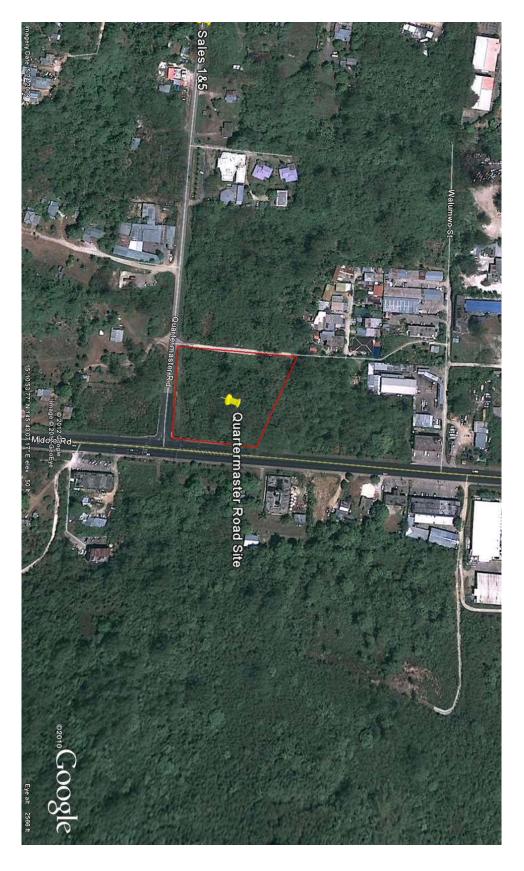
Cock Fight Arena Site



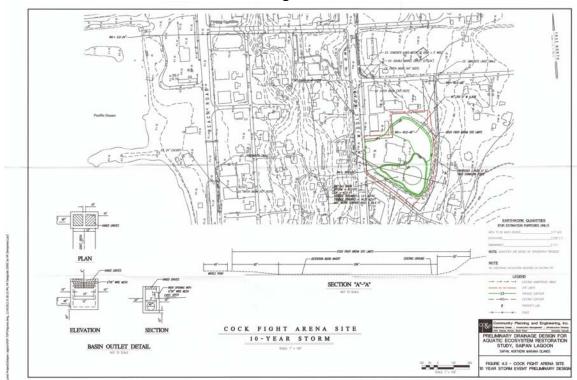
### **China House Site**



### **Quartermaster Road Site**



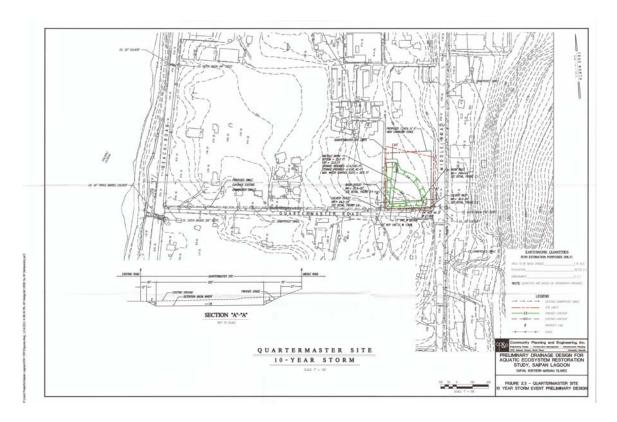
#### **Cock Fight Arena**



#### **China House**



#### **Quartermaster Road**



Appendix H
Cost Estimates

## SAIPAN LAGOON ECOSYSTEM RESTORATION FEASIBILITY

#### **Total Project Cost Summary**

The Army Corps of Engineers Cost Engineer was given nine alternatives to cost out. There were three different sites with three storm events represented for each site. An estimate was made for each alternative. These estimates were given to Environet, Inc. to conduct an incremental cost analysis and determine a combination of the three sites that would produce the most cost effective plan. From this incremental cost analysis, seven combinations were derived and four (including a no action plan) plans were chosen for further analysis. Environet, Inc. gave the four combination alternatives to the Corps and the construction costs from these site/storm combinations were used to determine a contingency value for each alternative.

The Corps performed an Abbreviated Cost and Schedule Risk Analysis for each combination alternative to determine a contingency value. First, a risk register was created for potential risk areas for each risk element to include, Project Scope, Acquisition Strategy, Construction Complexity, Volatile Commodities, Quantities, Fabrication & Project Installed Equipment, Cost Estimating Method, and External Project Risks. The PDT reviewed these risks and rated them for this project. Then a risk register was used to calculate a total contingency for each alternative. The Abbreviated Risk Analysis tables are provided in this Appendix for each combination alternative.

The contingencies were then inputted into the Total Project Cost Summary (TPCS) along with the Lands and Damages cost (taken from the Real Estate Planning Report, dated 2 October 2012), the Planning, Engineering and Design cost, and the Construction Management cost. All of these costs were added together, along with the monies spent and an escalation factor to determine the Total Project Cost. The Total Project Cost Summary tables are provided in this Appendix for each combination alternative.

The following assumptions were made in determining the cost estimates for each alternative:

- Project duration is 16 months.
- Project Management cost is \$237k.
- Planning and Environmental Compliance cost is \$1,099k.
- Engineering and Design cost is \$244k.
- Engineering Tech Review ITR & VE cost is \$50k.
- Contracting and Reprographics cost is \$25k.
- Engineering During Construction cost is \$100k.

• Construction Management cost is \$346k. Cost includes labor, travel and QA testing.

#### **Post-Construction Monitoring**

Post-Construction Monitoring includes costs associated with the monitoring/sampling effort, project management, and preparation of annual monitoring reports for 5 years. Costs are included in the estimate for 5 monitoring events (Year 1, 3, 5, 7, 10) after construction.

#### **Cost Assumptions**

#### Saipan Lagoon Ecosystem Restoration - ROM

#### PM: Milton Yoshimoto

- 1. The estimate is based on the Environmental Restoration Report (Pre-Draft), dated January 2013, and the Preliminary Drainage Design.
- 2. It is estimated that the construction will take 16 months to complete and the overall project will take 20 months.
- 3. The construction start date is estimated to begin around July 2015.
- 4. The construction mid point is estimated to be January 2016.
- 5. Escalation Factor used is 3.21.(3/12 6/13)
- 6. For Alternative 2, items that are included in WBS 3 Reservoirs is everything except for drainage item and post-construction monitoring.
- 7. For Alternative 3, items included in WBS 3 are everything except for drainage, driveway and basin, and post-construction monitoring.
- 8. For Alternative 4, items included in WBS 3 are everything except for drainage, driveway and basin, and post-construction monitoring.
- 9. Contingency is based on Abbreviated Cost and Schedule Risk Analysis.
- 10. SIOH is based on the duration of 16 months for the total project time.
- 11. CPM: Start date is 6/1/15 and End date is 9/30/16.
- 12. Rain Delay is 14 working days.
- 13. This estimate contains no overtime to complete the project.
- 14. Quantities are provided by Community Planning and Engineering, Inc.
- 15. Calculations based on plans are presented as take-offs (see QTO sheet).
- 16. The base estimate includes the fuel prices as follows for Saipan:

Electricity: \$0.36

Gas: \$5.23

Diesel (Off-Road): \$5.32 Diesel (On-Road): \$5.32

- 17. Sales Tax is 0%.
- 18. Labor rates were created as a MII Library called Saipan Labor rates. These rates were created in 2008. Labor rates were escalated to 2013 using the EM 1110-2-1304 Quarterly Cost Indexes by CWBS Feature Code, dated 31Mar13.
- 19. Equipment rates are from the 2011 MII Equipment Library.
- 20. All three sites are within 1.5 miles of each other.
- 21. There are contractors with the necessary equipment located in Saipan.

- 22. There are no manufacturers in the CNMI. All fabricated materials are imported from a variety of places.
- 23. All excess materials will be hauled to the landfill located in Marpi, about 10 miles away.
- 24. The source for the borrow/fill material will come from the sites.
- 25. Material used will be balanced, however, in the event there is excess embankment the material will be hauled to the Marpi landfill to be used as capping material.

#### \*\*\*\* TOTAL PROJECT COST SUMMARY \*\*\*\*

PROJECT: Saipan Lagoon Ecosystem Restoration

PROJECT NO:

LOCATION: Saipan Lagoon, Sasipan

DISTRICT: NWW WALLA WALLA

PREPARED: 6/18/2013

65%

\$4,529

\$2,439

\$792

\$692

\$8,451

\LD. **0/10/201** 

POC: CHIEF, COST ENGINEERING, Gary F. Yamauchi

ESTIMATED FEDERAL COST:

FEASIBILITY FEDERAL COST:

ESTIMATED NON-FEDERAL COST:

FEASIBILITY NON-FEDERAL COST:

**ESTIMATED TOTAL PROJECT COST:** 

This Estimate reflects the scope and schedule in report; CAP Feasibility STUDY - ECOSYSTEM RESTORATION REPORT

| Civil                            | Works Work Breakdown Structure                                |                                         | ESTIMATE                  | D COST                    |                        | PRO                    | JECT FIRST<br>Dollar        | COST<br>Basis) | (Constant        | то                             | TAL PROJEC | CT COST (FU               | LLY FUNDED     | ))                        |
|----------------------------------|---------------------------------------------------------------|-----------------------------------------|---------------------------|---------------------------|------------------------|------------------------|-----------------------------|----------------|------------------|--------------------------------|------------|---------------------------|----------------|---------------------------|
|                                  |                                                               |                                         |                           |                           |                        |                        | ram Year (Boective Price L  |                | 2016<br>1 OCT 15 | Spent Thru:                    |            |                           |                |                           |
| WBS<br><u>NUMBER</u><br><b>A</b> | Civil Works Feature & Sub-Feature Description  B              | COST<br>_(\$K)                          | CNTG<br>(\$K)<br><b>D</b> | CNTG<br>_(%)_<br><i>E</i> | TOTAL<br>_(\$K)        | ESC<br>(%)<br><b>G</b> | COST<br>_(\$K)_<br><b>H</b> | CNTG<br>_(\$K) | TOTAL<br>(\$K)   | 10/1/2012<br>(\$K)<br><i>K</i> | ,          | COST<br>(\$K)<br><b>M</b> | CNTG<br>_(\$K) | FULL<br>(\$K)<br><b>O</b> |
| 03<br>03                         | RESERVOIRS<br>RESERVOIRS                                      | \$838<br>\$621                          | \$237<br>\$176            | 28%<br>28%                | \$1,074.76<br>\$796.62 | 4.4%<br>4.4%           | \$875<br>\$648              | \$247<br>\$183 | \$1,122<br>\$832 |                                | _          | \$892<br>\$703            | \$252<br>\$199 | \$1,144<br>\$901          |
| 19                               | (Post Construction Monitoring) BUILDINGS, GROUNDS & UTILITIES | \$621 \$176 28%<br>-<br>\$690 \$195 28% |                           | \$884.66                  | 4.4%                   | \$720                  | \$204                       | \$924          |                  |                                | \$734      | \$208                     | \$941          |                           |
|                                  | CONSTRUCTION ESTIMATE TOTALS:                                 | \$2,148                                 | \$608                     | -                         | \$2,756.04             | 4.4%                   | \$2,244                     | \$634          | \$2,878          |                                |            | \$2,328                   | \$658          | \$2,986                   |
| 01                               | LANDS AND DAMAGES                                             | \$965                                   | \$47                      | 5%                        | \$1,012.00             | 4.4%                   | \$1,008                     | \$49           | \$1,057          |                                |            | \$1,013                   | \$49           | \$1,062                   |
| 22                               | FEASIBILITY STUDY (CAP studies)                               |                                         |                           |                           |                        |                        |                             |                |                  | \$1,483                        |            |                           |                | \$1,483                   |
| 30                               | PLANNING, ENGINEERING & DESIGN                                | \$1,841                                 | \$352                     | 19%                       | \$2,193.37             | 6.5%                   | \$1,962                     | \$375          | \$2,337          |                                |            | \$1,968                   | \$377          | \$2,345                   |
| 31                               | CONSTRUCTION MANAGEMENT                                       | \$443                                   | \$75                      | 17%                       | \$518.44               | 6.5%                   | \$472                       | \$80           | \$552            |                                |            | \$492                     | \$84           | \$576                     |
|                                  | PROJECT COST TOTALS:                                          | \$5,397                                 | \$1,082                   | 20%                       | \$6,479.85             |                        | \$5,685                     | \$1,139        | \$6,824          | \$1,483                        |            | \$5,800                   | \$1,168        | \$8,451                   |

| Mandatory by Regulation | CHIEF, COST ENGINEERING, Gary F. Yamauchi |
|-------------------------|-------------------------------------------|
| Mandatory by Regulation | PROJECT MANAGER, Milton Yoshimoto         |
| Mandatory by Regulation | CHIEF, REAL ESTATE, Craig H. Nakano       |
|                         | CHIEF, PLANNING, Anthony J. Paresa        |
|                         | CHIEF, ENGINEERING, Todd C. Barnes        |
|                         | CHIEF, OPERATIONS, Michael F. Wong        |
|                         | CHIEF, CONSTRUCTION, Louis Muzzarini      |
|                         | CHIEF, CONTRACTING, Roger David Williams  |
|                         | CHIEF, PM-PB, Roxanne E. Iseri            |
|                         | CHIEF, DPM, Milton Yoshimoto              |

#### \*\*\*\* TOTAL PROJECT COST SUMMARY \*\*\*\*

#### \*\*\*\* CONTRACT COST SUMMARY \*\*\*\*

PROJECT: Saipan Lagoon Ecosystem Restoration

DISTRICT: NWW WALLA WALLA

PREPARED: 6/18/2013

POC: CHIEF, COST ENGINEERING, Gary F. Yamauchi

LOCATION: Saipan Lagoon, Sasipan
This Estimate reflects the scope and schedule in report; CAP Feasibility STUDY - ECOSYSTEM RESTORATION REPORT

|                 | WBS Structure                     |                  | ESTIMATE                      | D COST         |                        | PRO          | JECT FIRST<br>Dollar        | COST<br>Basis) | (Constant         | To               | OTAL PROJECT | COST (FU             | LLY FUNDE   | D)            |
|-----------------|-----------------------------------|------------------|-------------------------------|----------------|------------------------|--------------|-----------------------------|----------------|-------------------|------------------|--------------|----------------------|-------------|---------------|
|                 |                                   |                  | nate Prepare<br>ive Price Lev |                | 3/22/2013<br>10/1/2012 |              | n Year (Bud<br>/e Price Lev |                | 2016<br>1 OCT 15  |                  |              |                      |             |               |
|                 |                                   |                  | R                             | ISK BASED      |                        |              |                             |                |                   |                  |              |                      |             |               |
| WBS             | Civil Works                       | COST             | CNTG                          | CNTG           | TOTAL                  | ESC          | COST                        | CNTG           | TOTAL             | Mid-Point        | INFLATED     | COST                 | CNTG        | FULL          |
| NUMBER          | Feature & Sub-Feature Description | (\$K)            | (\$K)                         | _(%)_          | (\$K)                  | _(%)_        | _(\$K)_                     | _(\$K)_        | _(\$K)_           | <u>Date</u>      | _(%)_        | _(\$K)_              | (\$K)       | _(\$K)_       |
| A               | В                                 | С                | D                             | E              | F                      | G            | <u> </u>                    | <u> </u>       | J                 | P                | <u></u>      | M                    | N           | 0             |
|                 | PHASE 1 or CONTRACT 1             |                  |                               |                |                        |              |                             |                |                   |                  |              |                      |             |               |
| 03              | RESERVOIRS                        | \$838            | \$237                         | 28.3%          | \$1,075                | 4.4%         | \$875                       | \$247          | \$1,122           | 2016Q2           | 1.9%         | \$892                | \$252       | \$1,144       |
| 03              | RESERVOIRS                        | \$621            | \$176                         | 28.3%          | \$797                  | 4.4%         | \$648                       | \$183          | \$832             | 2019Q3           | 8.3%         | \$703                | \$199       | \$901         |
|                 | (Post Construction Monitoring)    |                  |                               |                |                        |              |                             |                |                   |                  |              |                      |             |               |
| 19              | BUILDINGS, GROUNDS & UTILITIES    | \$690            | \$195                         | 28.3%          | \$885                  | 4.4%         | \$720                       | \$204          | \$924             | 2016Q2           | 1.9%         | \$734                | \$208       | \$941         |
|                 | CONSTRUCTION ESTIMATE TOTALS:     |                  | \$608                         | 28.3%          | \$2,756                | -            | \$2,244                     | \$634          | <br>\$2,878       |                  |              | \$2,328              | \$658       | \$2,986       |
|                 |                                   | <b>4</b> =, 1.10 | ****                          |                | <del>-</del> ,         |              | <del>*</del> =,= · ·        | ****           | <del>-</del> ,-,- |                  |              | <del>*</del> =,===   | ,,,,,       |               |
| 01              | LANDS AND DAMAGES                 | \$965            | \$47                          | 4.9%           | \$1,012                | 4.4%         | \$1,008                     | \$49           | \$1,057           | 2015Q3           | 0.5%         | \$1,013              | \$49        | \$1,062       |
| 30              | DI ANNINO ENGINEEDINO A REGIONI   |                  |                               |                |                        |              |                             |                |                   |                  |              |                      |             |               |
|                 | PLANNING, ENGINEERING & DESIGN    | <b>#007</b>      | <b>Ф4</b> Г                   | 40.40/         | <b>#</b> 000           | 0.50/        | ¢ого.                       | <b>C40</b>     | <b>CO04</b>       | 204500           |              | ФОГО                 | ¢40         | ¢201          |
| 11.03%          | .,                                | \$237            | \$45                          | 19.1%          | \$282                  | 6.5%         | \$253                       | \$48           | \$301             | 2015Q2           |              | \$253                | \$48        | \$301         |
| 51.16%          | 3                                 | \$1,099          | \$210                         | 19.1%          | \$1,309                | 6.5%         | \$1,171                     | \$224          | \$1,395           | 2015Q2           |              | \$1,171              | \$224       | \$1,395       |
| 11.36%<br>2.33% | 3 - 3 - 3 - 3                     | \$244            | \$47                          | 19.1%          | \$291                  | 6.5%         | \$260                       | \$50<br>\$40   | \$310             | 2015Q2<br>2015Q2 |              | \$260<br>\$53        | \$50        | \$310<br>\$63 |
| 2.33%<br>1.16%  | 8 8                               | \$50             | \$10<br>\$5                   | 19.1%<br>19.1% | \$60<br>\$30           | 6.5%<br>6.5% | \$53<br>\$27                | \$10<br>\$5    | \$63<br>\$32      | 2015Q2<br>2015Q2 |              | \$53<br>\$27         | \$10<br>\$5 | \$63<br>\$32  |
|                 |                                   | \$25             | • •                           |                | *                      |              |                             |                | •                 |                  | 4.00/        | ֆ∠ <i>1</i><br>\$111 |             | \$32<br>\$132 |
| 4.66%<br>2.00%  | 3 3                               | \$100<br>\$43    | \$19<br>\$8                   | 19.1%<br>19.1% | \$119<br>\$51          | 6.5%<br>6.5% | \$107<br>\$46               | \$20<br>\$9    | \$127<br>\$55     | 2016Q2<br>2016Q2 | 4.2%<br>4.2% | \$111<br>\$48        | \$21<br>\$9 | \$132<br>\$57 |
| 2.00%           | 8 8                               | \$43<br>\$43     | ъо<br>\$8                     |                | \$51<br>\$51           | 6.5%         | \$46<br>\$46                | \$9<br>\$9     | φοο<br>\$55       | 2016Q2<br>2015Q2 | 4.2%         | \$46                 | \$9<br>\$9  | \$57<br>\$55  |
| 2.00%           | Project Operations                | \$43             | \$8                           | 19.1%          | \$51                   | 6.5%         | \$46                        | 29             | \$55              | 2015Q2           |              | \$46                 | \$9         | \$55          |
| 31              | CONSTRUCTION MANAGEMENT           |                  |                               |                |                        |              |                             |                |                   |                  |              |                      |             |               |
| 16.11%          | Construction Management           | \$346            | \$59                          | 17.0%          | \$405                  | 6.5%         | \$369                       | \$63           | \$431             | 2016Q2           | 4.2%         | \$384                | \$65        | \$450         |
| 2.00%           | Project Operation:                | \$43             | \$7                           | 17.0%          | \$50                   | 6.5%         | \$46                        | \$8            | \$54              | 2016Q2           | 4.2%         | \$48                 | \$8         | \$56          |
| 2.50%           | Project Management                | \$54             | \$9                           | 17.0%          | \$63                   | 6.5%         | \$58                        | \$10           | \$67              | 2016Q2           | 4.2%         | \$60                 | \$10        | \$70          |
|                 | CONTRACT COST TOTALS:             | \$5,397          | \$1,082                       |                | \$6,480                | =            | \$5,685                     | \$1,139        | \$6,824           |                  | =            | \$5,800              | \$1,168     | \$6,968       |

#### **Abbreviated Risk Analysis**

Project (less than \$40M): Saipan Lagoon Ecosystem Restoration - TSP(C0Q0A1)

Project Development Stage: Feasibility (Recommended Plan)

Risk Category: Moderate Risk: Typical Project or Possible Life Safety

Total Construction Contract Cost = \$ 2,148,130

|    | <u>CWWBS</u>                         | Feature of Work                                                    | <u>C</u> | ontract Cost           | % Contingency    | <u>\$</u> | Contingency              | <u>Total</u> |
|----|--------------------------------------|--------------------------------------------------------------------|----------|------------------------|------------------|-----------|--------------------------|--------------|
|    | 01 LANDS AND DAMAGES                 | Real Estate                                                        | \$       | 965,000                | 4.87%            | \$        | 47,000                   | 1,012,000.33 |
| 1  | 03 RESERVOIRS                        | 1 Mobilization - Demobilization                                    | \$       | 41,723                 | 22.92%           | \$        | 9,562                    | 51,285.28    |
| _2 | 03 RESERVOIRS                        | 2 Chainlink Fence                                                  | \$       | 111,299                | 20.18%           | \$        | 22,455                   | 133,754.07   |
| _3 | 03 RESERVOIRS                        | 3 Dewatering                                                       | \$       | 96,826                 | 26.96%           | \$        | 26,103                   | 122,929.38   |
| 4  | 03 RESERVOIRS                        | 4 Road Crossing                                                    | \$       | 47,641                 | 13.14%           | \$        | 6,260                    | 53,901.46    |
| _5 | 03 RESERVOIRS                        | 5 Grading                                                          | \$       | 540,336                | 42.14%           | \$        | 227,684                  | 768,020.50   |
| 6  | 03 RESERVOIRS                        | 6 Post-Construction Monitoring                                     | \$       | 620,671                | 7.04%            | \$        | 43,671                   | 664,342.45   |
| 7  | 19 BUILDINGS, GROUNDS, AND UTILITIES | 7 Drainage                                                         | \$       | 689,634                | 39.42%           | \$        | 271,839                  | 961,472.93   |
| 8  |                                      |                                                                    |          |                        | 0.00%            | \$        | - 9                      | <del>-</del> |
| 9  |                                      |                                                                    |          |                        | 0.00%            | \$        | - 9                      | <del>-</del> |
| 12 |                                      | Remaining Construction Items                                       | \$       | _                      | 0.0% 0.00%       | \$        | - 9                      | <del>-</del> |
| 13 | 30 PLANNING, ENGINEERING, AND DESIGN | Planning, Engineering, & Design                                    | \$       | 1,841,000              | 19.14%           | \$        | 352,426                  | 2,193,425.56 |
| 14 | 31 CONSTRUCTION MANAGEMENT           | Construction Management                                            | \$       | 443,000                | 17.03%           | \$        | 75,458                   | 5 518,457.73 |
|    |                                      | Totals                                                             |          |                        |                  |           |                          |              |
|    |                                      | Real Estate                                                        |          | 965,000                | 4.87%            | \$        | 47,000                   |              |
|    |                                      | Total Construction Estimate Total Planning, Engineering & Design   |          | 2,148,130<br>1,841,000 | 28.28%<br>19.14% | \$        | 607,576 \$<br>352,426 \$ | · · ·        |
|    |                                      | Total Planning, Engineering & Design Total Construction Management |          | 443,000                | 19.14%           | Ф<br>\$   | 352,426 \$<br>75,458 \$  | , ,          |
|    |                                      | Total Construction Management  Total                               |          | 5,397,130              | 17.0070          | \$        | 1,082,460                |              |

### **Abbreviated Risk Analysis**

# Saipan Lagoon Ecosystem Restoration - C0Q0A1 Feasibility

Meeting Date: 22-Mar-13

PDT Members (Typical Recommended)

Project Management: Milton Yoshimoto

Cost Estimator: Lana Murishige
Environmentalist: Sonia Shjesgadt
Environmentalist: Miya Akiba

Engineering & Design:
Engineering & Design:
Project Management:

Anson Murayama
Frank Camacho
Uyen Tran

### Saipan Lagoon Ecosystem Restoration - TSP(C0Q0A1) Feasibility (Recommended Plan) Abbreviated Risk Analysis

Risk Level

| y Likely | 2          | 3        | 4           | 5        | 5      |
|----------|------------|----------|-------------|----------|--------|
| Likely   | 1          | 2        | 3           | 4        | 5      |
| Possible | 0          | - 1      | 2           | 3        | 4      |
| Unlikely | 0          | 0        | 1           | 2        | 3      |
|          | Negligible | Marginal | Significant | Critical | Crisis |

| Risk<br>Element | Feature of Work                   | Concerns Pull Down Tab (ENABLE MACROS<br>THRU TRUST CENTER)<br>(Choose ALL that apply) | Concerns                                                                             | PDT Discussions & Conclusions (Include logic & iustification for choice of Likelihood & Impact)                                                                                                                                                                        | Likelihood | Impact             | Risk<br>Level |
|-----------------|-----------------------------------|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------|---------------|
| Project S       | Scope Growth                      |                                                                                        |                                                                                      |                                                                                                                                                                                                                                                                        |            |                    |               |
|                 |                                   |                                                                                        |                                                                                      |                                                                                                                                                                                                                                                                        | Max Pot    | ential Cost Growth | 75%           |
| PS-1            | Mobilization - Demobilization     | Project accomplish intent?                                                             | Schedule is assumed and subject to change.                                           | A more detailed design will be required and the topo is anticipated to be out of date.                                                                                                                                                                                 | Possible   | Marginal           | 1             |
| PS-2            | 2 Chainlink Fence                 | Potential for scope growth, added features and quantities?                             | Possible quantity differential if site limits change.                                |                                                                                                                                                                                                                                                                        | Likely     | Marginal           | 2             |
| PS-3            | 3 Dewatering                      | Investigations sufficient to support design assumptions?                               | Schedule is assumed and subject to change. Soil report will be needed.               | A more detailed design will be required and the topo is anticipated to be out of date.                                                                                                                                                                                 | Likely     | Marginal           | 2             |
| PS-4            | 4 Road Crossing                   | Investigations sufficient to support design assumptions?                               | Topo may not be most current thus affecting assumed locations of road and utilities. |                                                                                                                                                                                                                                                                        | Possible   | Negligible         | 0             |
| PS-5            | 5 Grading                         | Design confidence?                                                                     | 10% conceptual design only. Existing topo may not be most current.                   | A more detailed design will be required and the topo is anticipated to be out of date.                                                                                                                                                                                 | Likely     | Significant        | 3             |
| PS-6            | 6 Post-Construction<br>Monitoring | Potential for scope growth, added features and quantities?                             | Additional monitoring may be required if performance standards aren't met.           | It is unlikely that there would be any changes after construction.                                                                                                                                                                                                     | Unlikely   | Marginal           | 0             |
| PS-7            | 7 Drainage                        | Potential for scope growth, added features and quantities?                             | 10% conceptual design only. Condition of existing utilities may be different.        | A more detailed design will be required. The condition of the existing utilities is<br>unknown and the assumption was made that the existing utilities will convey all<br>the unoff from the watershed to the basin.                                                   | Likely     | Significant        | 3             |
| PS-8            | 0                                 | Potential for scope growth, added features and quantities?                             |                                                                                      |                                                                                                                                                                                                                                                                        | Unlikely   | Negligible         | 0             |
| PS-9            | 0                                 | Potential for scope growth, added features and quantities?                             |                                                                                      |                                                                                                                                                                                                                                                                        | Unlikely   | Negligible         | 0             |
| PS-10           | 0                                 | Potential for scope growth, added features and quantities?                             |                                                                                      |                                                                                                                                                                                                                                                                        | Unlikely   | Negligible         | 0             |
| PS-11           | 0                                 | Potential for scope growth, added features and quantities?                             |                                                                                      |                                                                                                                                                                                                                                                                        | Unlikely   | Negligible         | 0             |
| PS-12           | Remaining Construction Items      | Potential for scope growth, added features and quantities?                             | None.                                                                                |                                                                                                                                                                                                                                                                        | Unlikely   | Negligible         | 0             |
| PS-13           | Planning, Engineering, & Design   | Potential for scope growth, added features and quantities?                             | Need to provide 100% Design.                                                         | A more detailed design will be required and the topo is anticipated to be out of<br>date. The condition of the existing utilities is unknown and the assumption was<br>made that the existing utilities will convey all the runoff from the watershed to<br>the basin. | Likely     | Marginal           | 2             |
| PS-14           | Construction Management           | Potential for scope growth, added features and quantities?                             | Need to provide 100% Design.                                                         | A more detailed design will be required and the topo is anticipated to be out of date. The condition of the existing utilities is unknown and the assumption was made that the existing utilities will convey all the runoff from the watershed to the basin.          | Likely     | Marginal           | 2             |

| Acquisit | on Strategy                        | T                                                                          |                                                                                                            |                                                                                                                                                      | Max Po   | ential Cost Growth | 3 |
|----------|------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------|---|
| AS-1     | 1 Mobilization -<br>Demobilization | Contracting plan firmly established?                                       |                                                                                                            |                                                                                                                                                      | Unlikely | Negligible         | 0 |
| S-2      | 2 Chainlink Fence                  | Contracting plan firmly established?                                       |                                                                                                            |                                                                                                                                                      | Unlikely | Negligible         | 0 |
|          |                                    |                                                                            |                                                                                                            |                                                                                                                                                      | Unlikely | Marginal           | 0 |
| i-3      | 3 Dewatering                       | Contracting plan firmly established?                                       | Topo may not be most current thus affecting assumed locations of road and utilities for essement purposes. | Due to unknown contract schedule, plans may be altered.                                                                                              | Unlikely | Negligible         |   |
| -4       | 4 Road Crossing  5 Grading         | Contracting plan firmly established?  Contracting plan firmly established? | general or vesestrent purposes.  Contracting plan established.                                             | Due to unknown contract schedule, plans may be altered.                                                                                              | Unlikely | Marginal           |   |
| -5       | 6 Post-Construction                |                                                                            |                                                                                                            | Due to unknown contract schedule, plans may go attered.  The reasonable assumption is that the prime contractor will be performing most of the work. | Unlikely | Marginal           |   |
| 6        | Monitoring                         | Contracting plan firmly established?                                       | Contract acquisition strategy is assumed as full and open, invitation for bid.                             |                                                                                                                                                      | Unlikely | Marginal           |   |
| -7       | 7 Drainage                         | Contracting plan firmly established?  Contracting plan firmly established? | Contracting plan established.                                                                              | Due to unknown contract schedule, plans may be altered.                                                                                              | Unlikely | Negligible         |   |
| 9        | 0                                  | Contracting plan firmly established?                                       |                                                                                                            |                                                                                                                                                      | Unlikely | Negligible         |   |
|          | 0                                  | Contracting plan firmly established?                                       |                                                                                                            |                                                                                                                                                      | Unlikely | Negligible         |   |
| 10       |                                    |                                                                            |                                                                                                            |                                                                                                                                                      | Unlikely | Negligible         |   |
| 11       | Remaining Construction             | Contracting plan firmly established?  Contracting plan firmly established? | Nee                                                                                                        |                                                                                                                                                      | Unlikely | Negligible         |   |
| 12       | Planning, Engineering, &           |                                                                            | process.                                                                                                   |                                                                                                                                                      | Unlikely | Negligible         |   |
| 13       | Design                             | Contracting plan firmly established?                                       | None.                                                                                                      |                                                                                                                                                      | Unlikely | Negligible         |   |

|       |                                 |                                                 | T                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                | Max Po   | tential Cost Growth | 25% |
|-------|---------------------------------|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------------------|-----|
| E-1   | Mobilization - Demobilization   | Accelerated schedule or harsh weather schedule? | Major cleaning and grubbing required. Soil conditions. Location of project requires special mobilization. There is a possibility for major construction modifications if special equipment or subcontractors need to be transported to the site. Full for equipment. | A soils report was never performed for this study, only research was taken into account. The likelihood of the anticipated soils type to change is very unlikely, however in the case an unanticipated soil type is found the impact would have a marginal effect. Fuel costs are likely to fluctuate, however the fuel costs are a small percentage to the price of the protect as a whole.   | Likely   | Marginal            | 2   |
| DE-2  | 2 Chainlink Fence               | Accelerated schedule or harsh weather schedule? |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                | Unlikely | Negligible          | 0   |
| DE-3  | 3 Dewatering                    | Accelerated schedule or harsh weather schedule? | Major clearing and grubbing required. Soil conditions. Location of project requires special mobilization. There is a possibility for major construction modifications if special equipment or subcontractors need to be transported to the site. Fuel for equipment. | A soils report was never performed for this study, only research was taken into account. The likelihood of the anticipated soils type to change is very unlikely, however in the case an unanticipated soil by pe is found the impact would have a marginal effect. Fuel costs are likely to fluctuate, however the fuel costs are as small percentage to the price of the project as a whole. | Likely   | Marginal            | 2   |
| CE-4  | 4 Road Crossing                 | Accelerated schedule or harsh weather schedule? | Fuel for equipment.                                                                                                                                                                                                                                                  | Fuel costs are likely to fluctuate, however the fuel costs are a small percentage to the project as a whole.                                                                                                                                                                                                                                                                                   | Likely   | Negligible          | 1   |
| CE-5  | 5 Grading                       | Accelerated schedule or harsh weather schedule? | Major clearing and grubbing required. Soil conditions. Location of project requires special mobilization. There is a possibility for major construction modifications if special equipment or subcontractors need to be transported to the site. Foul for equipment. | A soils report was never performed for this study, only research was taken into account. The likelihood of the anticipated soils type to change is very unlikely, however in the case an unanticipated soil bype is found the impact would have a marginal effect. Fuel costs are likely to fluctuate, however the fuel costs are as small percentage to the price of the project as a whole.  | Likely   | Marginal            | 2   |
| CE-6  | 6 Post-Construction             | Accelerated schedule or harsh weather schedule? | Project complexity of these items may impact construction bid, site complexity, possible contract modifications.                                                                                                                                                     | The listed cost items are fairly simple. Any risk is likely low.                                                                                                                                                                                                                                                                                                                               | Unlikely | Negligible          | 0   |
| DE-7  | 7 Drainage                      | Accelerated schedule or harsh weather schedule? | Soil conditions. Location of project requires special mobilization. Fuel for entirement                                                                                                                                                                              | A soils report was never performed for this study, only research was taken into account. The likelihood of the anticipated soils type to change is very unlikely, however in the case an unanticipated soil type is found the impact would war a marginal effect. Fuel costs are likely to fluctuate, however the fuel costs are as small percentage to the price of the priced as a whole.    | Likely   | Marginal            | 2   |
|       |                                 | Accelerated schedule or harsh weather schedule? |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                | Unlikely | Negligible          | 0   |
| DE-8  |                                 |                                                 |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                | Unlikely | Negligible          |     |
| CE-9  | U                               | Accelerated schedule or harsh weather schedule? |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                | Unlikely | Negligible          | 0   |
| CE-10 | 0                               | Accelerated schedule or harsh weather schedule? |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                | Unlikely | Negligible          | 0   |
| DE-11 | Remaining Construction          | Accelerated schedule or harsh weather schedule? |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                | Unlikely | Negligible          | 0   |
| CE-12 | Items  Planning, Engineering, & | Accelerated schedule or harsh weather schedule? | None.                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                | Unlikely | Negligible          | 0   |
| CE-13 | Design                          | Accelerated schedule or harsh weather schedule? | None.                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                | Unlikely | Negligible          | 0   |
| CE-14 | Construction Management         | Accelerated schedule or harsh weather schedule? | None.                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                |          |                     | 0   |

| Quantitie | es for Current Scope              |                                                         |                                                                                           |                                                                                                                                                                   |          |                    |     |
|-----------|-----------------------------------|---------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------|-----|
|           |                                   |                                                         |                                                                                           |                                                                                                                                                                   | Max Pot  | ential Cost Growth | 20% |
| Q-1       | Mobilization -     Demobilization | Level of confidence based on design and assumptions?    | Topo may not be most current thus affecting the grading quantities. Design is conceptual. | The topo is anticipated to be out of date, therefore the grading quantities are likely to change but should only change to have a marginal impact to the project. | Likely   | Marginal           | 2   |
| Q-2       | 2 Chainlink Fence                 | Level of confidence based on design and assumptions?    | Location of properties on topo may not be most current affecting perimeter locations.     | The topo is anticipated to be out of date, therefore the grading quantities are likely to change but should only change to have a marginal impact to the project. | Likely   | Marginal           | 2   |
| Q-3       | 3 Dewatering                      | Level of confidence based on design and assumptions?    | Topo may not be most current thus affecting the grading quantities. Design is conceptual. | The topo is anticipated to be out of date, therefore the grading quantities are likely to change but should only change to have a marginal impact to the project. | Likely   | Negligible         | 1   |
| Q-4       | 4 Road Crossing                   | Level of confidence based on design and assumptions?    |                                                                                           |                                                                                                                                                                   | Unlikely | Negligible         | 0   |
| Q-5       | 5 Grading                         | Level of confidence based on design and assumptions?    | Topo may not be most current thus affecting the grading quantities. Design is conceptual. | The topo is anticipated to be out of date, therefore the grading quantities are likely to change but should only change to have a marginal impact to the project. | Likely   | Significant        | 3   |
| Q-6       | 6 Post-Construction<br>Monitoring | Level of confidence based on design and assumptions?    | As design evolves quantities on current project scope may change due to refinement.       | It is unlikely that there would be any changes after construction.                                                                                                | Unlikely | Marginal           | 0   |
| Q-7       | 7 Drainage                        | Level of confidence based on design and<br>assumptions? | Design is conceptual.                                                                     | With a complete design infrastructure quantities may change slightly.                                                                                             | Likely   | Marginal           | 2   |
| Q-8       | 0                                 | Level of confidence based on design and assumptions?    |                                                                                           |                                                                                                                                                                   | Unlikely | Negligible         | 0   |
| Q-9       | 0                                 | Level of confidence based on design and assumptions?    |                                                                                           |                                                                                                                                                                   | Unlikely | Negligible         | 0   |
| Q-10      | 0                                 | Level of confidence based on design and assumptions?    |                                                                                           |                                                                                                                                                                   | Unlikely | Negligible         | 0   |
| Q-11      | 0                                 | Level of confidence based on design and assumptions?    |                                                                                           |                                                                                                                                                                   | Unlikely | Negligible         | 0   |
| Q-12      | Remaining Construction            | Level of confidence based on design and assumptions?    | None.                                                                                     |                                                                                                                                                                   | Unlikely | Negligible         | 0   |
| Q-13      | Planning, Engineering, & Design   | Level of confidence based on design and assumptions?    | None.                                                                                     |                                                                                                                                                                   | Unlikely | Negligible         | 0   |
| Q-14      | Construction Management           | Level of confidence based on design and<br>assumptions? | None.                                                                                     |                                                                                                                                                                   | Unlikely | Negligible         | 0   |

| Specialt | y Fabrication or Equipr           | ment                                                            |                                                                                                                                                    |                                                                                                                                                                                                                                                | Max Po   | tential Cost Growth | 75% |
|----------|-----------------------------------|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------------------|-----|
| FE-1     | Mobilization - Demobilization     | Unusual parts, material or equipment manufactured or installed? | Any specialized fabrication could impact cost due to change of material costs, complex designs, sole source fabrications that are not competitive. |                                                                                                                                                                                                                                                | Possible | Marginal            | 1   |
| FE-2     | 2 Chainlink Fence                 | Unusual parts, material or equipment manufactured or installed? |                                                                                                                                                    |                                                                                                                                                                                                                                                | Unlikely | Marginal            | 0   |
| FE-3     | 3 Dewatering                      | Unusual parts, material or equipment manufactured or installed? | Installation of the basin inlet and outlet.                                                                                                        | A more detailed design of the basin inlet and outlet will likely be needed, but the impact of the difference compared to the conceptual design should be negligible.                                                                           | Possible | Marginal            | 1   |
| FE-4     | 4 Road Crossing                   | Unusual parts, material or equipment manufactured or installed? |                                                                                                                                                    |                                                                                                                                                                                                                                                | Unlikely | Negligible          | 0   |
| FE-5     | 5 Grading                         | Unusual parts, material or equipment manufactured or installed? | Installation of the basin inlet and outlet.                                                                                                        | A more detailed design of the basin inlet and outlet will likely be needed, but the impact of the difference compared to the conceptual design should be negligible.                                                                           | Possible | Significant         | 2   |
| FE-6     | 6 Post-Construction<br>Monitoring | Unusual parts, material or equipment manufactured or installed? | Any specialized fabrication could impact cost due to change of material costs, complex designs, sole source fabrications that are not competitive. | Not applicable.                                                                                                                                                                                                                                | Unlikely | Negligible          | 0   |
| FE-7     | 7 Drainage                        | Unusual parts, material or equipment manufactured or installed? | Installation of the culvert inlet and outlet. Fabrication of manholes.                                                                             | A more detailed design of the culvert inlet and outlet will likely be needed, but the impact of the difference compared to the conceptual design should be negligible and the addition of the drain manholes will have a more marginal impact. | Possible | Significant         | 2   |
| FE-8     | 0                                 | Unusual parts, material or equipment manufactured or installed? |                                                                                                                                                    |                                                                                                                                                                                                                                                | Unlikely | Negligible          | 0   |
| FE-9     | 0                                 | Unusual parts, material or equipment manufactured or installed? |                                                                                                                                                    |                                                                                                                                                                                                                                                | Unlikely | Negligible          | 0   |
| E-10     | 0                                 | Unusual parts, material or equipment manufactured or installed? |                                                                                                                                                    |                                                                                                                                                                                                                                                | Unlikely | Negligible          | 0   |
| FE-11    | 0                                 | Unusual parts, material or equipment manufactured or installed? |                                                                                                                                                    |                                                                                                                                                                                                                                                | Unlikely | Negligible          | 0   |
| FE-12    | Remaining Construction            | Unusual parts, material or equipment manufactured or installed? | None.                                                                                                                                              |                                                                                                                                                                                                                                                | Unlikely | Negligible          | 0   |
| FE-13    | Planning, Engineering, & Design   | Unusual parts, material or equipment manufactured or installed? | None.                                                                                                                                              |                                                                                                                                                                                                                                                | Unlikely | Negligible          | 0   |
| FE-14    | Construction Management           | Unusual parts, material or equipment manufactured or installed? | None.                                                                                                                                              |                                                                                                                                                                                                                                                | Unlikely | Negligible          | 0   |

| SI ESI | timate Assumptions                |                                       |                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                      | Max Pot  | tential Cost Growth | ┰ |
|--------|-----------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------------------|---|
| 1      | Mobilization - Demobilization     | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to<br>establish costs and are relative to contractor markups and assignment,<br>quantiles, crews and productivities, quotes and historical cost data. Cost is<br>based on current pricing. | Depending on when the construction takes place, prices could vary greatly and<br>to dependent on the economy. Major quantities were provided by the AE and<br>the critical cost items were adjusted to reflect reasonable cost as if this war<br>bid item. As further details are developed, the major line item costs will be<br>refined which could significantly affect the cost. | Possible | Significant         |   |
| 2      | 2 Chainlink Fence                 | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to<br>establish costs and are relative to contractor markups and assignment,<br>quantiles, crews and productivities, quotes and historical cost data. Cost is<br>based on current prining. | Depending on when the construction takes place, prices could vary greatly and is dependent on the economy. Major quantities were provided by the AE and the critical cost items were adjusted to reflect reasonable cost as if this were a bid item. As further details are developed, the major line item costs will be refined which could significantly affect the cost.          | Possible | Significant         |   |
|        | 3 Dewatering                      | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to establish costs and are relative to contractor markups and assignment, quantiles, crews and productivities, quotes and historical cost data. Cost is based on current princing.         | Depending on when the construction takes place, prices could vary greatly and is dependent on the economy. Major quantities were provided by the AE and the critical cost items were adjusted to reflect reasonable cost as if this were a bid item. As further details are developed, the major line item costs will be refined which could significantly affect the cost.          | Possible | Significant         |   |
|        | 4 Road Crossing                   | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to establish costs and are relative to contractor markups and assignment, quantiles, crews and productivities, quotes and historical cost data. Cost is based on current pricing.          | Depending on when the construction takes place, prices could vary greatly and is dependent on the economy. Major quantities were provided by the AE and the critical cost items were adjusted to reflect reasonable cost as if this were a bid item. As further details are developed, the major line item costs will be refined which could significantly affect the cost.          | Possible | Significant         |   |
|        | 5 Grading                         | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to establish costs and are relative to contractor markups and assignment, quantities, crews and productivities, quotes and historical cost data. Cost is based on current princing.        | Depending on when the construction takes place, prices could vary greatly and is dependent on the economy. Major quantities were provided by the AE and the critical cost items were adjusted to reflect reasonable cost as if this were a bid item. As further details are developed, the major line item costs will be infined which could significantly affect the cost.          | Possible | Significant         |   |
|        | 6 Post-Construction<br>Monitoring | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to establish costs and are relative to contractor markups and assignment, quantiles, crews and productivities, quotes and historical cost data. Cost is based on current pricing.          | Depending on when the construction takes place, prices could vary greatly and is dependent on the economy. Major quantities were provided by the AE and the critical cost items were adjusted to reflect reasonable cost as if this were a bid item. As further details are developed, the major line item costs will be infined which could significantly affect the cost.          | Possible | Marginal            |   |
|        | 7 Drainage                        | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to establish costs and are relative to contractor markups and assignment, quantiles, crews and productivities, quotes and historical cost data. Cost is based on current princing.         | Depending on when the construction takes place, prices could vary greatly and is dependent on the economy. Major quantities were provided by the AE and the critical cost liters were adjusted to reflect reasonable cost as if this were a bid item. As further details are developed, the major line item costs will be refined which could significantly affect the cost.         | Possible | Significant         |   |
|        | 0                                 | Reliability and number of key quotes? |                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                      | Unlikely | Negligible          |   |
|        | 0                                 | Reliability and number of key quotes? |                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                      | Unlikely | Negligible          |   |
|        | 0                                 | Reliability and number of key quotes? |                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                      | Unlikely | Negligible          |   |
|        | 0                                 | Reliability and number of key quotes? |                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                      | Unlikely | Negligible          |   |
|        | Remaining Construction            | Reliability and number of key quotes? | None.                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                      | Unlikely | Negligible          |   |
|        | Planning, Engineering, & Design   | Reliability and number of key quotes? | Assumptions based or concept design. Assumptions were used to establish costs and are relative to contractor markups and assignment, quantities, crews and productivities, quotes and historical cost data. Cost is based on current pricing.         |                                                                                                                                                                                                                                                                                                                                                                                      | Possible | Significant         |   |
|        |                                   | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to establish costs and are relative to contractor markups and assignment, quantities, crews and productivities, quotes and instinctal cost data. Cost is                                   |                                                                                                                                                                                                                                                                                                                                                                                      | Possible | Marginal            |   |

| External | Project Risks                      |                                       |                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                     |          |                    |     |
|----------|------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------|-----|
|          |                                    | I                                     | 1                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                     | Max Pot  | ential Cost Growth | 40% |
| EX-1     | 1 Mobilization -<br>Demobilization | Potential for severe adverse weather? | External risks such as failure to obtain permits in a timely manner, political risks, delays or cancellation of funding sources could impact project costs. Potential for adverse weather.                                                | Depending on the project schedule, weather is likely to affect the project schedule. However, the construction of the basin would be part of the critical path so the impact would have a marginal effect.                                                                                                                                          | Possible | Marginal           | 1   |
| EX-2     | 2 Chainlink Fence                  | Potential for severe adverse weather? | External risks such as failure to obtain permits in a timely manner, political risks, delays or cancellation of funding sources could impact project costs. Potential for adverse weather.                                                | Depending on the project schedule, weather is likely to affect the project schedule. However, the construction of the basin would be part of the critical path so the impact would have a marginal effect.                                                                                                                                          | Possible | Marginal           | 1   |
| EX-3     | 3 Dewatering                       | Potential for severe adverse weather? | External risks such as failure to obtain permits in a timely manner, political risks, delays or cancellation of funding sources could impact project costs. Potential for adverse weather.                                                | Depending on the project schedule, weather is likely to affect the project schedule. However, the construction of the basin would be part of the critical path so the impact would have a marginal effect.                                                                                                                                          | Possible | Significant        | 2   |
| EX-4     | 4 Road Crossing                    | Potential for severe adverse weather? | External risks such as failure to obtain permits in a timely manner, political risks, delays or cancellation of funding sources could impact project costs. Potential for adverse weather.                                                | Depending on the project schedule, weather is likely to affect the project schedule. However, the construction of the basin would be part of the critical path so the impact would have a marginal effect.                                                                                                                                          | Possible | Marginal           | 1   |
| EX-5     | 5 Grading                          | Potential for severe adverse weather? | External risks such as failure to obtain permits in a timely manner, political risks, delays or cancellation of funding sources could impact project costs.<br>Potential for adverse weather.                                             | Depending on the project schedule, weather is likely to affect the project schedule. However, the construction of the basin would be part of the critical path so the impact would have a marginal effect.                                                                                                                                          | Possible | Significant        | 2   |
| EX-6     | 6 Post-Construction<br>Monitoring  | Potential for severe adverse weather? | External risks such as failure to obtain permits in a timely manner, political risks, delays or cancellation of funding sources could impact project costs.<br>Potential for adverse weather.                                             | Depending on the project schedule, weather is likely to affect the project schedule. However, the construction of the basin would be part of the critical path so the impact would have a marginal effect.                                                                                                                                          | Possible | Negligible         | 0   |
| EX-7     | 7 Drainage                         | Potential for severe adverse weather? | External risks such as failure to obtain permits in a timely manner, political<br>risks, delays or cancellation of funding sources could impact project costs.<br>Ability to establish easement acreements. Portural for adverse weather. | Depending on the project schedule, weather is likely to affect the project schedule. However, the construction of the basin would be part of the critical path so the impract would have a marginal effect. The ability to establish easements which may be needed to convey the discharge to the lagoon may have a marginal effect on the project. | Possible | Significant        | 2   |
| EX-8     | 0                                  | Potential for severe adverse weather? |                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                     | Unlikely | Negligible         | 0   |
| EX-9     | 0                                  | Potential for severe adverse weather? |                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                     | Unlikely | Negligible         | 0   |
| EX-10    | 0                                  | Potential for severe adverse weather? |                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                     | Unlikely | Negligible         | 0   |
| EX-11    | 0                                  | Potential for severe adverse weather? |                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                     | Unlikely | Negligible         | 0   |
| EX-12    | Remaining Construction Items       | Potential for severe adverse weather? | None.                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                     | Unlikely | Negligible         | 0   |
| EX-13    | Planning, Engineering, & Design    | Potential for severe adverse weather? | External risks such as political, funding sources could impact project costs over time.                                                                                                                                                   | Changes to permitting and other requirements could result in added coordination and design efforts.                                                                                                                                                                                                                                                 | Possible | Significant        | 2   |
| EV-14    |                                    | Potential for severe adverse weather? | Potential for adverse weather                                                                                                                                                                                                             | Severe weather could impact the grading of the site and impact the schedule                                                                                                                                                                                                                                                                         | Possible | Significant        | 2   |

Saipan Lagoon Ecosystem Restoration - TSP(C0Q0A1)
Feasibility (Recommended Plan)
Abbreviated Risk Analysis

|                                       |                                      |                              |              |                 |           |                     | Potential             | Risk Areas | i |   |   |                               |                                     |                            |
|---------------------------------------|--------------------------------------|------------------------------|--------------|-----------------|-----------|---------------------|-----------------------|------------|---|---|---|-------------------------------|-------------------------------------|----------------------------|
|                                       | 1 Mobilization .<br>Demobilization . | <sup>2</sup> Chainlink Fence | 3 Dewalering | 4 Road Crossing | 5 Grading | 6 Post-Construction | <sup>2</sup> Drainage | 0          | 0 | 0 | 0 | Remaining<br>Construction les | Planning,<br>Engineering,<br>Design | Construction<br>Management |
| Project Scope Growth                  | 1                                    | 2                            | 2            | -               | 3         | -                   | 3                     | -          | - | - | - | -                             | 2                                   | 2                          |
| Acquisition Strategy                  | -                                    | -                            | -            | -               | -         | -                   | -                     | -          | - | - | - | -                             | -                                   | -                          |
| Construction Elements                 | 2                                    | -                            | 2            | 1               | 2         | -                   | 2                     | -          | - | - | - | -                             | -                                   | -                          |
| Quantities for Current<br>Scope       | 2                                    | 2                            | 1            | -               | 3         | -                   | 2                     | -          | - | - | - | -                             | -                                   | -                          |
| Specialty Fabrication or<br>Equipment | 1                                    | -                            | 1            | -               | 2         | -                   | 2                     | -          | - | - | - | -                             | -                                   | -                          |
| Cost Estimate<br>Assumptions          | 2                                    | 2                            | 2            | 2               | 2         | 1                   | 2                     | -          | - | - | - | -                             | 2                                   | 1                          |
| External Project Risks                | 1                                    | 1                            | 2            | 1               | 2         | -                   | 2                     | -          | - | - | - | -                             | 2                                   | 2                          |

**Typical Risk Elements** 

\$8,316

\$4,478

\$792

\$692

\$14,277

65%

#### \*\*\*\* TOTAL PROJECT COST SUMMARY \*\*\*\*

PROJECT: Saipan Lagoon Ecosystem Restoration

PROJECT NO:

LOCATION: Saipan Lagoon, Sasipan

DISTRICT: NWW WALLA WALLA

PREPARED: 6/18/2013

POC: CHIEF, COST ENGINEERING, Gary F. Yamauchi

ESTIMATED FEDERAL COST:

FEASIBILITY FEDERAL COST:

ESTIMATED NON-FEDERAL COST:

FEASIBILITY NON-FEDERAL COST:

**ESTIMATED TOTAL PROJECT COST:** 

This Estimate reflects the scope and schedule in report; CAP Feasibility STUDY - ECOSYSTEM RESTORATION REPORT

| Civil                            | Works Work Breakdown Structure                       |                           | ESTIMATE                    | D COST                   |                              | PRO                    | JECT FIRST<br>Dollar        | COST<br>Basis) | (Constant           | то                 | TAL PROJE | CT COST (FU               | LLY FUNDE                   | ))                        |
|----------------------------------|------------------------------------------------------|---------------------------|-----------------------------|--------------------------|------------------------------|------------------------|-----------------------------|----------------|---------------------|--------------------|-----------|---------------------------|-----------------------------|---------------------------|
|                                  |                                                      |                           |                             |                          |                              | II ~                   | ram Year (Brective Price L  |                | 2016<br>1 OCT 15    | Spent Thru:        |           |                           |                             |                           |
| WBS<br><u>NUMBER</u><br><b>A</b> | Civil Works Feature & Sub-Feature Description B      | COST<br>(\$K)<br><b>C</b> | CNTG<br>_(\$K)_<br><b>D</b> | CNTG<br>_(%)<br><i>E</i> | TOTAL<br>_(\$K)_<br><b>F</b> | ESC<br>(%)<br><b>G</b> | COST<br>_(\$K)_<br><i>H</i> | CNTG<br>_(\$K) | TOTAL<br>(\$K)<br>J | 10/1/2012<br>(\$K) | L         | COST<br>(\$K)<br><b>M</b> | CNTG<br>_(\$K)_<br><b>N</b> | FULL<br>(\$K)<br><b>O</b> |
| 03<br>03                         | RESERVOIRS RESERVOIRS (Post Construction Monitoring) | \$1,127<br>\$1,241        | \$346<br>\$381              | 31%<br>31%               | \$1,472.88<br>\$1,621.86     | 4.4%<br>4.4%           | \$1,177<br>\$1,296          | \$361<br>\$398 | \$1,538<br>\$1,694  |                    |           | \$1,199<br>\$1,404        | \$368<br>\$431              | \$1,567<br>\$1,835        |
| 19                               | BUILDINGS, GROUNDS & UTILITIES                       | \$3,140                   | \$964                       | 31%                      | \$4,103.67                   | 4.4%                   | \$3,279                     | \$1,006        | \$4,285             |                    |           | \$3,341                   | \$1,025                     | \$4,367                   |
|                                  | CONSTRUCTION ESTIMATE TOTALS:                        | \$5,508                   | \$1,690                     |                          | \$7,198.41                   | 4.4%                   | \$5,752                     | \$1,765        | \$7,517             |                    |           | \$5,944                   | \$1,824                     | \$7,769                   |
| 01                               | LANDS AND DAMAGES                                    | \$1,466                   | \$135                       | 9%                       | \$1,600.98                   | 4.4%                   | \$1,531                     | \$141          | \$1,672             |                    |           | \$1,538                   | \$142                       | \$1,680                   |
| 22                               | FEASIBILITY STUDY (CAP studies)                      |                           |                             |                          |                              |                        |                             |                |                     | \$1,483            |           |                           |                             | \$1,483                   |
| 30                               | PLANNING, ENGINEERING & DESIGN                       | \$1,975                   | \$418                       | 21%                      | \$2,392.52                   | 6.5%                   | \$2,104                     | \$445          | \$2,549             |                    |           | \$2,114                   | \$447                       | \$2,561                   |
| 31                               | CONSTRUCTION MANAGEMENT                              | \$594                     | \$113                       | 19%                      | \$707.04                     | 6.5%                   | \$633                       | \$120          | \$753               |                    |           | \$659                     | \$125                       | \$785                     |
|                                  | PROJECT COST TOTALS:                                 | \$9,543                   | \$2,356                     | 25%                      | \$11,898.94                  |                        | \$10,020                    | \$2,471        | \$12,491            | \$1,483            |           | \$10,256                  | \$2,538                     | \$14,277                  |

| Mandatory by Regulation | CHIEF, COST ENGINEERING, Gary F. Yamauchi |
|-------------------------|-------------------------------------------|
| Mandatory by Regulation | PROJECT MANAGER, Milton Yoshimoto         |
| Mandatory by Regulation | CHIEF, REAL ESTATE, Craig H. Nakano       |
|                         | CHIEF, PLANNING, Anthony J. Paresa        |
|                         | CHIEF, ENGINEERING, Todd C. Barnes        |
|                         | CHIEF, OPERATIONS, Michael F. Wong        |
|                         | CHIEF, CONSTRUCTION, Louis Muzzarini      |
|                         | CHIEF, CONTRACTING, Roger David Williams  |
|                         | CHIEF, PM-PB, Roxanne E. Iseri            |
|                         | CHIEF, DPM, Milton Yoshimoto              |

#### \*\*\*\* TOTAL PROJECT COST SUMMARY \*\*\*\*

#### \*\*\*\* CONTRACT COST SUMMARY \*\*\*\*

PROJECT: Saipan Lagoon Ecosystem Restoration

DISTRICT: NWW WALLA WALLA

PREPARED: 6/18/2013

POC: CHIEF, COST ENGINEERING, Gary F. Yamauchi

LOCATION: Saipan Lagoon, Sasipan
This Estimate reflects the scope and schedule in report; CAP Feasibility STUDY - ECOSYSTEM RESTORATION REPORT

|        | WBS Structure                     |         | ESTIMATE                       | D COST    |                        | PRO  | JECT FIRST<br>Dollar        | COST<br>Basis) | (Constant        | TO               | OTAL PROJECT | COST (FU | LLY FUNDE    | D)       |
|--------|-----------------------------------|---------|--------------------------------|-----------|------------------------|------|-----------------------------|----------------|------------------|------------------|--------------|----------|--------------|----------|
|        |                                   |         | nate Prepared<br>ive Price Lev |           | 3/22/2013<br>10/1/2012 |      | n Year (Bud<br>ve Price Lev |                | 2016<br>1 OCT 15 |                  |              |          |              |          |
|        |                                   |         | RI                             | ISK BASED |                        |      |                             |                |                  |                  |              |          |              |          |
| WBS    | Civil Works                       | COST    | CNTG                           | CNTG      | TOTAL                  | ESC  | COST                        | CNTG           | TOTAL            | Mid-Point        | INFLATED     | COST     | CNTG         | FULL     |
| NUMBER | Feature & Sub-Feature Description | (\$K)   | (\$K)                          | _(%)_     | (\$K)                  | _(%) | _(\$K)_                     | _(\$K)_        | _(\$K)_          | <u>Date</u>      | _(%)_        | _(\$K)_  | (\$K)        | _(\$K)_  |
| Α      | В                                 | С       | D                              | E         | F                      | G    | H                           | <u> </u>       | J                | P                | <u></u>      | M        | N            | 0        |
|        | PHASE 1 or CONTRACT 1             |         |                                |           |                        |      |                             |                |                  |                  |              |          |              |          |
| 03     | RESERVOIRS                        | \$1,127 | \$346                          | 30.7%     | \$1,473                | 4.4% | \$1,177                     | \$361          | \$1,538          | 2016Q2           | 1.9%         | \$1,199  | \$368        | \$1,567  |
| 03     | RESERVOIRS                        | \$1,241 | \$381                          | 30.7%     | \$1,622                | 4.4% | \$1,296                     | \$398          | \$1,694          | 2019Q3           | 8.3%         | \$1,404  | \$431        | \$1,835  |
|        | (Post Construction Monitoring)    |         |                                |           |                        |      |                             |                |                  |                  |              |          |              |          |
| 19     | BUILDINGS, GROUNDS & UTILITIES    | \$3,140 | \$964                          | 30.7%     | \$4,104                | 4.4% | \$3,279                     | \$1,006        | \$4,285          | 2016Q2           | 1.9%         | \$3,341  | \$1,025      | \$4,367  |
|        | CONSTRUCTION ESTIMATE TOTALS:     |         | \$1,690                        | 30.7%     | \$7,198                | -    | \$5,752                     | \$1,765        | <del></del>      |                  |              | \$5,944  | \$1,824      | \$7,769  |
|        |                                   |         |                                |           |                        |      |                             |                |                  |                  |              |          |              |          |
| 01     | LANDS AND DAMAGES                 | \$1,466 | \$135                          | 9.2%      | \$1,601                | 4.4% | \$1,531                     | \$141          | \$1,672          | 2015Q3           | 0.5%         | \$1,538  | \$142        | \$1,680  |
| 30     | PLANNING. ENGINEERING & DESIGN    |         |                                |           |                        |      |                             |                |                  |                  |              |          |              |          |
| 4.30%  |                                   | \$237   | \$50                           | 21.1%     | \$287                  | 6.5% | \$253                       | \$53           | \$306            | 2015Q2           |              | \$253    | \$53         | \$306    |
| 19.95% | .,                                | \$1,099 | \$232                          | 21.1%     | \$1,331                | 6.5% | \$1.171                     | \$248          | \$1,419          | 2015Q2<br>2015Q2 |              | \$1.171  | \$248        | \$1,419  |
| 4.43%  | 3                                 | \$1,099 | \$52                           | 21.1%     | \$296                  | 6.5% | \$260                       | \$55           | \$315            | 2015Q2<br>2015Q2 |              | \$260    | \$55         | \$315    |
| 0.91%  |                                   | \$50    | \$32<br>\$11                   | 21.1%     | \$61                   | 6.5% | \$53                        | \$33<br>\$11   | \$65             | 2015Q2<br>2015Q2 |              | \$53     | \$33<br>\$11 | \$65     |
| 0.45%  |                                   | \$25    | \$5                            | 21.1%     | \$30                   | 6.5% | \$33<br>\$27                | \$6            | \$32             | 2015Q2<br>2015Q2 |              | \$27     | \$6          | \$32     |
| 1.82%  |                                   | \$100   | \$21                           | 21.1%     | \$121                  | 6.5% | \$107                       | \$23           | \$129            | 2016Q2           | 4.2%         | \$111    | \$23         | \$134    |
| 2.00%  |                                   | \$110   | \$23                           | 21.1%     | \$133                  | 6.5% | \$117                       | \$25           | \$142            | 2016Q2           | 4.2%         | \$122    | \$26         | \$148    |
| 2.00%  | 8 8                               | \$110   | \$23                           | 21.1%     | \$133                  | 6.5% | \$117                       | \$25           | \$142            | 2015Q2           | 1.270        | \$117    | \$25         | \$142    |
| 31     | CONSTRUCTION MANAGEMENT           |         |                                |           |                        |      |                             |                |                  |                  |              |          |              |          |
| 6.28%  | Construction Management           | \$346   | \$66                           | 19.0%     | \$412                  | 6.5% | \$369                       | \$70           | \$439            | 2016Q2           | 4.2%         | \$384    | \$73         | \$457    |
| 2.00%  | Project Operation:                | \$110   | \$21                           | 19.0%     | \$131                  | 6.5% | \$117                       | \$22           | \$140            | 2016Q2           | 4.2%         | \$122    | \$23         | \$145    |
| 2.50%  | Project Management                | \$138   | \$26                           | 19.0%     | \$164                  | 6.5% | \$147                       | \$28           | \$175            | 2016Q2           | 4.2%         | \$153    | \$29         | \$182    |
|        | CONTRACT COST TOTALS:             | \$9,543 | \$2,356                        |           | \$11,899               | =    | \$10,020                    | \$2,471        | \$12,491         |                  | =            | \$10,256 | \$2,538      | \$12,794 |

#### **Abbreviated Risk Analysis**

Project (less than \$40M): Saipan Lagoon Ecosystem Restoration - Alt 3 (C2Q0A' Project Development Stage: Feasibility (Alternatives)

Risk Category: Moderate Risk: Typical Project or Possible Life Safety

Total Construction Contract Cost = \$ 5,508,242

|    | <u>CWWBS</u>                         | Feature of Work                                                  | <u>Co</u> | ontract Cost           | % Contingency    | <u>\$</u> | Contingency                | <u>Total</u>           |
|----|--------------------------------------|------------------------------------------------------------------|-----------|------------------------|------------------|-----------|----------------------------|------------------------|
|    | 01 LANDS AND DAMAGES                 | Real Estate                                                      | \$        | 1,466,200              | 9.21%            | \$        | 135,000 \$                 | 1,601,200.37           |
| 1  | 03 RESERVOIRS                        | 1 Mobilization - Demobilization                                  | \$        | 97,806                 | 24.92%           | \$        | 24,372 \$                  | 122,177.78             |
| 2  | 03 RESERVOIRS                        | 2 Chainlink Fence                                                | \$        | 168,897                | 22.18%           | \$        | 37,454 \$                  | 206,350.66             |
| 3  | 03 RESERVOIRS                        | 3 Dewatering                                                     | \$        | 175,314                | 28.96%           | \$        | 50,769 \$                  | 226,083.29             |
| 4  | 03 RESERVOIRS                        | 4 Road Crossing                                                  | \$        | 52,614                 | 15.14%           | \$        | 7,966 \$                   | 60,580.24              |
| _5 | 03 RESERVOIRS                        | 5 Grading                                                        | \$        | 632,725                | 44.14%           | \$        | 279,269 \$                 | 911,994.48             |
| 6  | 03 RESERVOIRS                        | 6 Post-Construction Monitoring                                   | \$        | 1,241,342              | 9.04%            | \$        | 112,170 \$                 | 1,353,511.75           |
| 7  | 19 BUILDINGS, GROUNDS, AND UTILITIES | 7 Drainage                                                       | \$        | 1,089,350              | 41.42%           | \$        | 451,185 \$                 | 1,540,535.40           |
| 8  | 19 BUILDINGS, GROUNDS, AND UTILITIES | 8 Driveway                                                       | \$        | 36,363                 | 17.42%           | \$        | 6,336 \$                   | 42,698.56              |
| 9  | 19 BUILDINGS, GROUNDS, AND UTILITIES | 9 Basin                                                          | \$        | 2,013,831              | 35.79%           | \$        | 720,833 \$                 | 2,734,664.16           |
| 12 |                                      | Remaining Construction Items                                     | \$        | _                      | 0.0% 0.00%       | \$        | - \$                       | <u>-</u>               |
| 13 | 30 PLANNING, ENGINEERING, AND DESIGN | Planning, Engineering, & Design                                  | \$        | 1,975,000              | 21.14%           | \$        | 417,577 \$                 | 2,392,577.39           |
| 14 | 31 CONSTRUCTION MANAGEMENT           | Construction Management                                          | \$        | 594,000                | 19.03%           | \$        | 113,058 \$                 | 707,058.08             |
|    |                                      | Totals                                                           |           |                        |                  |           |                            |                        |
|    |                                      | Real Estate                                                      |           | 1,466,200              | 9.21%            | \$        | 135,000 \$                 | 1,601,200.37           |
|    |                                      | Total Construction Estimate Total Planning, Engineering & Design |           | 5,508,242<br>1,975,000 | 30.69%<br>21.14% | ¢         | 1,690,354 \$<br>417,577 \$ | 7,198,596<br>2,392,577 |
|    |                                      | Total Construction Management                                    |           | 594,000                | 19.03%           | \$        | 113,058 \$                 | 707,058                |
|    |                                      | Total                                                            |           | 9,543,442              |                  | \$        | 2,355,990 \$               | 11,899,432             |

### **Abbreviated Risk Analysis**

# Saipan Lagoon Ecosystem Restoration - C2Q0A1 Feasibility

Meeting Date: 22-Mar-13

PDT Members (Typical Recommended)

Project Management: Milton Yoshimoto

Cost Estimator: Lana Murishige
Environmentalist: Sonia Shjesgadt
Environmentalist: Miya Akiba

Engineering & Design:
Engineering & Design:
Project Management:

Anson Murayama
Frank Camacho
Uyen Tran

## Saipan Lagoon Ecosystem Restoration - Alt 3 (C2Q0A1) Feasibility (Alternatives) Abbreviated Risk Analysis

Meeting Date: ######

Risk Level

| Very Likely | 2          | 3        | 4           | 5        | 5      |
|-------------|------------|----------|-------------|----------|--------|
| Likely      | 1          | 2        | 3           | 4        | 5      |
| Possible    | 0          | - 1      | 2           | 3        | 4      |
| Unlikely    | 0          | 0        | 1           | 2        | 3      |
|             | Negligible | Marginal | Significant | Critical | Crisis |

| Risk<br>Element | Feature of Work                   | Concerns Pull Down Tab (ENABLE MACROS<br>THRU TRUST CENTER)<br>(Choose ALL that apply) | Concerns                                                                             | PDT Discussions & Conclusions (Include logic & iustification for choice of Likelihood & Impact)                                                                                                                                                                        | Likelihood | Impact              | Risk<br>Level |
|-----------------|-----------------------------------|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------------|---------------|
| Project S       | cope Growth                       |                                                                                        |                                                                                      |                                                                                                                                                                                                                                                                        |            |                     |               |
| <u></u>         |                                   |                                                                                        |                                                                                      |                                                                                                                                                                                                                                                                        | Max Po     | tential Cost Growth | 75%           |
| PS-1            | Mobilization - Demobilization     | Project accomplish intent?                                                             | Schedule is assumed and subject to change.                                           | A more detailed design will be required and the topo is anticipated to be out of date.                                                                                                                                                                                 | Possible   | Marginal            | 1             |
| PS-2            | 2 Chainlink Fence                 | Potential for scope growth, added features and quantities?                             | Possible quantity differential if site limits change.                                |                                                                                                                                                                                                                                                                        | Likely     | Marginal            | 2             |
| PS-3            | 3 Dewatering                      | Investigations sufficient to support design assumptions?                               | Schedule is assumed and subject to change. Soil report will be needed.               | A more detailed design will be required and the topo is anticipated to be out of date.                                                                                                                                                                                 | Likely     | Marginal            | 2             |
| PS-4            | 4 Road Crossing                   | Investigations sufficient to support design assumptions?                               | Topo may not be most current thus affecting assumed locations of road and utilities. |                                                                                                                                                                                                                                                                        | Possible   | Negligible          | 0             |
| PS-5            | 5 Grading                         | Design confidence?                                                                     | .10% conceptual design only. Existing topo may not be most current.                  | A more detailed design will be required and the topo is anticipated to be out of date.                                                                                                                                                                                 | Likely     | Significant         | 3             |
| PS-6            | 6 Post-Construction<br>Monitoring | Potential for scope growth, added features and<br>quantities?                          | Additional monitoring may be required if performance standards aren't met.           | It is unlikely that there would be any changes after construction.                                                                                                                                                                                                     | Unlikely   | Marginal            | 0             |
| PS-7            | 7 Drainage                        | Potential for scope growth, added features and quantities?                             | 10% conceptual design only. Condition of existing utilifies may be different.        | A more detailed design will be required. The condition of the existing utilities is<br>unknown and the assumption was made that the existing utilities will convey all<br>the runoff from the watershed to the basin.                                                  | Likely     | Significant         | 3             |
| PS-8            | 8 Driveway                        | Potential for scope growth, added features and quantities?                             | Topo may not be most current thus affecting assumed locations of road and utilities. |                                                                                                                                                                                                                                                                        | Possible   | Negligible          | 0             |
| PS-9            | 9 Basin                           | Potential for scope growth, added features and quantities?                             | 10% conceptual design only. Condition of existing utilities may be different.        | A more detailed design will be required. The condition of the existing utilities is<br>unknown and the assumption was made that the existing utilities will convey all<br>the rundff from the watershed to the basin.                                                  | Likely     | Significant         | 3             |
| PS-10           | 0                                 | Potential for scope growth, added features and<br>quantities?                          |                                                                                      |                                                                                                                                                                                                                                                                        | Unlikely   | Negligible          | 0             |
| PS-11           | 0                                 | Potential for scope growth, added features and quantities?                             |                                                                                      |                                                                                                                                                                                                                                                                        | Unlikely   | Negligible          | 0             |
| PS-12           | Remaining Construction Items      | Potential for scope growth, added features and quantities?                             | None.                                                                                |                                                                                                                                                                                                                                                                        | Unlikely   | Negligible          | 0             |
| PS-13           | Planning, Engineering, & Design   | Potential for scope growth, added features and quantities?                             | Need to provide 100% Design.                                                         | A more detailed design will be required and the topo is anticipated to be out of<br>date. The condition of the existing utilities is unknown and the assumption was<br>made that the existing utilities will convey all the runoff from the watershed to<br>the basin. | Likely     | Marginal            | 2             |
| PS-14           | Construction Management           | Potential for scope growth, added features and quantities?                             | Need to provide 100% Design.                                                         | A more detailed design will be required and the topo is anticipated to be out of date. The condition of the existing utilities is unknown and the assumption was made that the existing utilities will convey all the runoff from the watershed to the basis.          | Likely     | Marginal            | 2             |

| Acquisit     | ion Strategy                      |                                                                              |                                                                                                                                             |                                                                                             | Max Pot  | ential Cost Growth | 30% |
|--------------|-----------------------------------|------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|----------|--------------------|-----|
| AS-1         | Mobilization - Demobilization     | Contracting plan firmly established?                                         |                                                                                                                                             |                                                                                             | Unlikely | Negligible         | 0   |
| S-2          | 2 Chainlink Fence                 | Contracting plan firmly established?                                         |                                                                                                                                             |                                                                                             | Unlikely | Negligible         | 0   |
| S-3          | 3 Dewatering                      | Contracting plan firmly established?                                         |                                                                                                                                             | Due to unknown contract schedule, plans may be altered.                                     | Unlikely | Marginal           | 0   |
| S-4          | 4 Road Crossing                   | Contracting plan firmly established?                                         | Topo may not be most current thus affecting assumed locations of road and utilities for easement purposes.                                  |                                                                                             | Unlikely | Negligible         | 0   |
| S-5          | 5 Grading                         | Contracting plan firmly established?                                         | Contracting plan established.                                                                                                               | Due to unknown contract schedule, plans may be altered.                                     | Unlikely | Marginal           | 0   |
| S-6          | 6 Post-Construction<br>Monitoring | Contracting plan firmly established?                                         | Contract convicition strategy is presumed as full and once invitation for hid                                                               | The reasonable assumption is that the prime contractor will be performing most of the work. | Unlikely | Marginal           | 0   |
|              |                                   | Contracting plan firmly established?                                         | Contractino clan established.                                                                                                               |                                                                                             | Unlikely | Marginal           | 0   |
| S-7<br>S-8   | 7 Drainage                        | Contracting plan firmly established?                                         | Community plane resistantiness.  Topo may not be most current thus affecting assumed locations of road and utilities for easement purposes. | Due to unknown contract schedule, plans may be altered.                                     | Unlikely | Negligible         | 0   |
| S-9          | 8 Driveway  9 Basin               | Contracting plan firmly established?                                         | Contracting plan established.                                                                                                               |                                                                                             | Unlikely | Marginal           | 0   |
|              | 9 Basin                           |                                                                              | Community pier vesidomireo.                                                                                                                 | Due to unknown contract schedule, plans may be altered.                                     | Unlikely | Negligible         | 0   |
| S-10<br>S-11 |                                   | Contracting plan firmly established?  Contracting plan firmly established?   |                                                                                                                                             |                                                                                             | Unlikely | Negligible         | 0   |
|              | Remaining Construction            | Contracting plan immy established?      Contracting plan firmly established? | Nee                                                                                                                                         |                                                                                             | Unlikely | Negligible         | 0   |
| S-12         | Planning, Engineering, &          |                                                                              | No.                                                                                                                                         |                                                                                             | Unlikely | Negligible         |     |
| S-13         | Design                            | Contracting plan firmly established?                                         | (None.                                                                                                                                      |                                                                                             | Unlikely | Negligible         | 0   |

| Negrotation of process and public services of process and public services of process and public services of process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and proces | Constru | ction Elements           |                                                 |                                                                                                                                                             | Max Po                                                                                                                                                                                                                                                                                                                             | tential Cost Growth | 25%        |       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------------------|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------|-------|
| Light Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the  |         |                          |                                                 |                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                    |                     |            | 20 /0 |
| See 2 County of Academic administrative trains investigate interesting of the control of page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the p | CE-1    |                          | Accelerated schedule or harsh weather schedule? | requires special mobilization. There is a possibility for major construction<br>modifications if special equipment or subcontractors need to be transported | account. The likelihood of the anticipated soils type to change is very unlikely,<br>however in the case an unanticipated soil type is found the impact would have<br>a marginal effect. Fuel costs are likely to fluctuate, however the fuel costs are a                                                                          | Likely              | Marginal   | 2     |
| Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application      |         |                          |                                                 |                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                    | Unlikely            | Negligible |       |
| Magnitude properties of the control of properties of the control of the control of properties of the control of the control of the control of properties of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of  | CE-2    | 2 Chainlink Fence        | Accelerated schedule or harsh weather schedule? |                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                    |                     |            | 0     |
| *** Accidenced category is a functional or hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weathe | CE-3    | 3 Dewatering             | Accelerated schedule or harsh weather schedule? | requires special mobilization. There is a possibility for major construction modifications if special equipment or subcontractors need to be transported.   | account. The likelihood of the anticipated soils type to change is very unlikely,<br>however in the case an unanticipated soil type is found the impact would have<br>a marcinal effect. Fuel costs are likely to fluctuate, however the fuel costs are a                                                                          | Likely              | Marginal   | 2     |
| Add in good was not preferred by the study, only recently was then into control or special engineers or advantaged softwards for head weather strucked?  CE 6 October - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule o |         |                          |                                                 |                                                                                                                                                             | Fuel costs are likely to fluctuate, however the fuel costs are a small percentage                                                                                                                                                                                                                                                  | Likely              | Negligible |       |
| Mary desired and gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradi | CE-4    | 4 Road Crossing          | Accelerated schedule or harsh weather schedule? | Fuel for equipment.                                                                                                                                         | to the price of the project as a whole.                                                                                                                                                                                                                                                                                            |                     |            | 1     |
| Fig. Combination  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committ | CE-5    | 5 Grading                | Accelerated schedule or harsh weather schedule? | modifications if special equipment or subcontractors need to be transported                                                                                 | account. The likelihood of the anticipated soils type to change is very unlikely,<br>however in the case an unanticipated soil type is found the impact would have<br>a marginal effect. Fuel costs are likely to fluctuate, however the fuel costs are a                                                                          | Likely              | Marginal   | 2     |
| A subsequent was more performed for this stady, poly resource and below into account. The silenthood of the stady, poly resource was below into account. The silenthood of the stady, poly resource was below into account. The silenthood of the stady, poly resource was below into account. The silenthood of the stady, poly resource was below into account. The silenthood of the stady, poly resource was below into account. The silenthood of the stady, poly resource was below into account. The silenthood of the stady was below the bed coals are amurpled when it is compared to the coals of the proper that a window and the proper that is coals of the proper that a window and the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on | CER     |                          | Accelerated schedule or barsh weather schedule? | Project complexity of these items may impact construction bid, site                                                                                         | The listed cost items are finish simple. Any sink is likely low                                                                                                                                                                                                                                                                    | Unlikely            | Negligible | 0     |
| EE-8 8 Driveway - Accelerated schedule or harsh weather schedule? Fuel for equipment.  Soil conditions. Location of project requires special mobilization. Fuel for analysis and analysis of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project  | CE-7    |                          | Accelerated schedule or harsh weather schedule? | Soil conditions. Location of project requires special mobilization. Fuel for equipment.                                                                     | A soils report was never performed for this study, only research was taken into account. The likelihood of the anticipated soils type to change is very unlikely, however in the case an unanticipated soil type is found the impact would have a marginal effect. Fuel costs are leafly to fuctuate, however the fuel costs are a | Likely              | Marginal   |       |
| A soil report was never performed for this study, only research was taken into account. The like although of the anticipated soil type is found the impact would have required an unanticipated soil type is found the impact would have required to the project requires special mobilization. Fuel for equire special mobilization. Fuel for equire special mobilization. Fuel for equire special mobilization in the project size as a whole.  Unakely Negligible  CE-10 0 **Accelerated schedule or harsh weather schedule?*  Unakely Negligible  CE-11 0 **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  Unakely Negligible  CE-12 Remaining Construction **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  |         |                          |                                                 |                                                                                                                                                             | Fuel costs are likely to fluctuate, however the fuel costs are a small percentage                                                                                                                                                                                                                                                  | Likely              | Negligible |       |
| CE-0 9 Basin *Accelerated schedule or harsh weather schedule? Soil conditions. Location of project requires special mobilization. Fuel for equipment.  CE-10 0 *Accelerated schedule or harsh weather schedule? Unlikely Negligible  CE-11 0 *Accelerated schedule or harsh weather schedule?  CE-12 Remaining Construction  CE-13 Design *Accelerated schedule or harsh weather schedule? None.  CE-13 Design *Accelerated schedule or harsh weather schedule? None.  CE-13 Design *Accelerated schedule or harsh weather schedule? None.  CE-14 Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CE-8    | 8 Driveway               | Accelerated schedule or harsh weather schedule? | Fuel for equipment.                                                                                                                                         | to the price of the project as a whole.                                                                                                                                                                                                                                                                                            |                     |            | 1     |
| CE-10 0 *Accelerated schedule or harsh weather schedule?  Unlikely Negligible  CE-11 0 *Accelerated schedule or harsh weather schedule?  Remaining Construction terms *Accelerated schedule or harsh weather schedule?  None.  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CE-9    | 9 Basin                  | Accelerated schedule or harsh weather schedule? | Soil conditions. Location of project requires special mobilization. Fuel for squipment.                                                                     | account. The likelihood of the anticipated soils type to change is very unlikely,<br>however in the case an unanticipated soil type is found the impact would have<br>a marginal effect. Fuel costs are likely to fluctuate, however the fuel costs are a                                                                          | Likely              | Marginal   | 2     |
| CE-11 0 *Accelerated schedule or harsh weather schedule?  CE-12 Remaining Construction lems  *Accelerated schedule or harsh weather schedule? None.  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CF-10   | 0                        | Accelerated schedule or harsh weather schedule? |                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                    | Unlikely            | Negligible | 0     |
| CE-11 0 *Accelerated schedule or harsh weather schedule?  Unlikely Negligible  Remaining Construction herns *Accelerated schedule or harsh weather schedule? None.  Unlikely Negligible  Planning, Engineering, & *Accelerated schedule or harsh weather schedule? None.  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | JL 10   |                          |                                                 |                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                    |                     |            |       |
| Remaining Construction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | CE-11   | 0                        | Accelerated schedule or harsh weather schedule? |                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                    | Unlikely            | Negligible | 0     |
| CE-13 Planning, Engineering, & Accelerated schedule or harsh weather schedule? None.  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CF-12   |                          | Accelerated schedule or harsh weather schedule? | None                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                    | Unlikely            | Negligible | 0     |
| CE-13 Design • Accelerated schedule or harsh weather schedule? None.  Unlikely Negligible                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |         | Planning, Engineering, & |                                                 | lavoue.                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                    | Unlikely            | Negligible |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CE-13   | Design                   | Accelerated schedule or harsh weather schedule? | None.                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                    |                     |            | 0     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CE-14   | Construction Management  | Accelerated schedule or harsh weather schedule? | None.                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                    | Unlikely            | Negligible | 0     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ,       | - management             |                                                 | •                                                                                                                                                           | •                                                                                                                                                                                                                                                                                                                                  |                     |            |       |

| Quantitie | es for Current Scope              |                                                         |                                                                                           |                                                                                                                                                                   |          |                    |     |
|-----------|-----------------------------------|---------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------|-----|
|           |                                   |                                                         | I                                                                                         | I                                                                                                                                                                 | Max Pot  | ential Cost Growth | 20% |
| Q-1       | Mobilization -     Demobilization | Level of confidence based on design and assumptions?    | Topo may not be most current thus affecting the grading quantities. Design is conceptual. | The topo is anticipated to be out of date, therefore the grading quantities are likely to change but should only change to have a marginal impact to the project. | Likely   | Marginal           | 2   |
| Q-2       | 2 Chainlink Fence                 | Level of confidence based on design and assumptions?    | Location of properties on topo may not be most current affecting perimeter locations.     | The topo is anticipated to be out of date, therefore the grading quantities are likely to change but should only change to have a marginal impact to the project. | Likely   | Marginal           | 2   |
| Q-3       | 3 Dewatering                      | Level of confidence based on design and assumptions?    | Topo may not be most current thus affecting the grading quantities. Design is conceptual. | The topo is anticipated to be out of date, therefore the grading quantities are likely to change but should only change to have a marginal impact to the project. | Likely   | Negligible         | 1   |
| Q-4       | 4 Road Crossing                   | Level of confidence based on design and assumptions?    |                                                                                           |                                                                                                                                                                   | Unlikely | Negligible         | 0   |
| Q-5       | 5 Grading                         | Level of confidence based on design and assumptions?    | Topo may not be most current thus affecting the grading quantities. Design is conceptual. | The topo is anticipated to be out of date, therefore the grading quantities are likely to change but should only change to have a marginal impact to the project. | Likely   | Significant        | 3   |
| Q-6       | 6 Post-Construction<br>Monitoring | Level of confidence based on design and assumptions?    | As design evolves quantities on current project scope may change due to refinement.       | It is unlikely that there would be any changes after construction.                                                                                                | Unlikely | Marginal           | 0   |
| Q-7       | 7 Drainage                        | Level of confidence based on design and assumptions?    | Design is conceptual.                                                                     | With a complete design infrastructure quantities may change slightly.                                                                                             | Likely   | Marginal           | 2   |
| Q-8       | 8 Driveway                        | Level of confidence based on design and<br>assumptions? |                                                                                           |                                                                                                                                                                   | Unlikely | Negligible         | 0   |
| Q-9       | 9 Basin                           | Level of confidence based on design and<br>assumptions? | Design is conceptual.                                                                     | With a complete design infrastructure quantities may change slightly.                                                                                             | Likely   | Marginal           | 2   |
| Q-10      | 0                                 | Level of confidence based on design and<br>assumptions? |                                                                                           |                                                                                                                                                                   | Unlikely | Negligible         | 0   |
| Q-11      | 0                                 | Level of confidence based on design and assumptions?    |                                                                                           |                                                                                                                                                                   | Unlikely | Negligible         | 0   |
| Q-12      | Remaining Construction            | Level of confidence based on design and assumptions?    | None.                                                                                     |                                                                                                                                                                   | Unlikely | Negligible         | 0   |
| Q-13      | Planning, Engineering, & Design   | Level of confidence based on design and assumptions?    | None.                                                                                     |                                                                                                                                                                   | Unlikely | Negligible         | 0   |
|           | Construction Management           | Level of confidence based on design and                 | None.                                                                                     |                                                                                                                                                                   | Unlikely | Negligible         | 0   |

| Specialty | y Fabrication or Equipn           | nent                                                            |                                                                                                                                                    | Max Po                                                                                                                                                                                                                                         | tential Cost Growth | 75%         |   |
|-----------|-----------------------------------|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------|---|
| FE-1      | Mobilization - Demobilization     | Unusual parts, material or equipment manufactured or installed? | Any specialized fabrication could impact cost due to change of material costs, complex designs, sole source fabrications that are not competitive. |                                                                                                                                                                                                                                                | Possible            | Marginal    | 1 |
| FE-2      | 2 Chainlink Fence                 | Unusual parts, material or equipment manufactured or installed? |                                                                                                                                                    |                                                                                                                                                                                                                                                | Unlikely            | Marginal    | 0 |
| FE-3      | 3 Dewatering                      | Unusual parts, material or equipment manufactured or installed? | Installation of the basin inlet and outlet.                                                                                                        | A more detailed design of the basin inlet and outlet will likely be needed, but the impact of the difference compared to the conceptual design should be negligible.                                                                           | Possible            | Marginal    | 1 |
| FE-4      | 4 Road Crossing                   | Unusual parts, material or equipment manufactured or installed? |                                                                                                                                                    |                                                                                                                                                                                                                                                | Unlikely            | Negligible  | 0 |
| FE-5      | 5 Grading                         | Unusual parts, material or equipment manufactured or installed? | Installation of the basin inlet and outlet.                                                                                                        | A more detailed design of the basin inlet and outlet will likely be needed, but the impact of the difference compared to the conceptual design should be negligible.                                                                           | Possible            | Significant | 2 |
| FE-6      | 6 Post-Construction<br>Monitoring | Unusual parts, material or equipment manufactured or installed? | Any specialized fabrication could impact cost due to change of material costs, complex designs, sole source fabrications that are not competitive. | Not applicable.                                                                                                                                                                                                                                | Unlikely            | Negligible  | 0 |
| FE-7      | 7 Drainage                        | Unusual parts, material or equipment manufactured or installed? | Installation of the culvert inlet and outlet. Fabrication of manholes.                                                                             | A more detailed design of the culvert inlet and outlet will likely be needed, but the impact of the difference compared to the conceptual design should be negligible and the addition of the drain manholes will have a more marginal impact. | Possible            | Significant | 2 |
| FE-8      | 8 Driveway                        | Unusual parts, material or equipment manufactured or installed? |                                                                                                                                                    |                                                                                                                                                                                                                                                | Unlikely            | Negligible  | 0 |
| FE-9      | 9 Basin                           | Unusual parts, material or equipment manufactured or installed? |                                                                                                                                                    |                                                                                                                                                                                                                                                | Unlikely            | Negligible  | 0 |
| FE-10     | 0                                 | Unusual parts, material or equipment manufactured or installed? |                                                                                                                                                    |                                                                                                                                                                                                                                                | Unlikely            | Negligible  | 0 |
| FE-11     | 0                                 | Unusual parts, material or equipment manufactured or installed? |                                                                                                                                                    |                                                                                                                                                                                                                                                | Unlikely            | Negligible  | 0 |
| FE-12     | Remaining Construction Items      | Unusual parts, material or equipment manufactured or installed? | None.                                                                                                                                              |                                                                                                                                                                                                                                                | Unlikely            | Negligible  | 0 |
| FE-13     | Planning, Engineering, & Design   | Unusual parts, material or equipment manufactured or installed? | None.                                                                                                                                              |                                                                                                                                                                                                                                                | Unlikely            | Negligible  | 0 |
|           | Construction Management           | Unusual parts, material or equipment manufactured or installed? | None.                                                                                                                                              |                                                                                                                                                                                                                                                | Unlikely            | Negligible  | 0 |

| K LO | timate Assumptions                |                                       |                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                              | Max Pot  | tential Cost Growth |
|------|-----------------------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------------------|
| ı    | Mobilization - Demobilization     | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to establish costs and are relative to contractor markups and assignment, quantities, crevs and productivities, quotes and historical cost data. Cost is based on current pricing.          | Depending on when the construction takes place, prices could very greatly and is dependent on the economy. Major quantities were provided by the AE and the critical cost items were adjusted to reflect reasonable cost as if this was abld item. As further details are developed, the major line item costs will be refined which could significantly affect the cost.    | Possible | Significant         |
|      | 2 Chainlink Fence                 | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to<br>establish costs and are relative to contractor markups and assignment,<br>quantities, crews and productivities, quotes and historical cost data. Cost is<br>based on current pricing. | Depending on when the construction takes place, prices could vary greatly and is dependent on the economy. Major quantities were provided by the AE and the critical cost items were algusted local sat if this ware abid item. As further details are developed, the major line item costs will be refined which could significantly affect the cost.                       | Possible | Significant         |
|      | 3 Dewatering                      | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to<br>establish costs and are relative to contractor markups and assignment,<br>quantities, crews and productivities, quotes and historical cost data. Cost is<br>based on current pricing. | Depending on when the construction takes place, prices could vary greatly and is dependent on the economy. Major quantities were provided by the AE and the critical cost times were adjusted to reflect reasonable cost as if this were a bid item. As further details are developed, the major line item costs will be refined which could significantly affect the cost.  | Possible | Significant         |
|      | 4 Road Crossing                   | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to<br>establish costs and are relative to contractor markups and assignment,<br>quantities, crews and productivities, quotes and historical cost data. Cost is<br>based on current pricing. | Depending on when the construction takes place, prices could vary greatly and is dependent on the economy. Major quantities were provided by the AE and the critical cost items were adjusted to reflect reasonable cost as if this were a bid item. As further details are developed, the major line item costs will be infined which could significantly affect the cost.  | Possible | Significant         |
|      | 5 Grading                         | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to<br>establish costs and are relative to contractor markups and assignment,<br>quantities, crews and productivities, quotes and historical cost data. Cost is<br>based on current pricing. | Depending on when the construction takes place, prices could vary greatly and is dependent on the economy. Major quantities were provided by the AE and the critical cost items were adjusted to reflect reasonable cost as if this were a bid item. As further details are developed, the major line item costs will be refined which could significantly affect the cost.  | Possible | Significant         |
|      | 6 Post-Construction<br>Monitoring | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to<br>establish costs and are relative to contractor markups and assignment,<br>quantities, crews and productivities, quotes and historical cost data. Cost is<br>based on current pricing. | Depending on when the construction takes place, prices could visry greatly and is dependent on the economy. Major quantities were provided by the AE and the critical cost items were adjusted to reflect reasonable cost as if this were a bid item. As further details are developed, the major line item costs will be infined which could significantly affect the cost. | Possible | Marginal            |
|      | 7 Drainage                        | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to<br>establish costs and are relative to contractor markups and assignment,<br>quantities, crews and productivities, quotes and historical cost data. Cost is<br>based on current pricing. | Depending on when the construction takes place, prices could vary greatly and is dependent on the economy. Major quantities were provided by the AE and the critical cost times were adjusted to reflect reasonable cost as if this were a bid item. As further details are developed, the major line item costs will be refined which could significantly affect the cost.  | Possible | Significant         |
|      | 8 Driveway                        | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to<br>establish costs and are relative to contractor markups and assignment,<br>quantities, crews and productivities, quotes and historical cost data. Cost is<br>based on current pricing. | Depending on when the construction takes place, prices could vary greatly and is dependent on the economy. Major quantities were provided by the AE and the critical cost times were adjusted to reflect reasonable cost as if this were a bid item. As further details are developed, the major line item costs will be refined which could significantly affect the cost.  | Possible | Significant         |
|      | 9 Basin                           | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to<br>establish costs and are relative to contractor markups and assignment,<br>quantities, crews and productivities, quotes and historical cost data. Cost is<br>based on current pricing. | Depending on when the construction takes place, prices could vary greatly and is dependent on the economy. Major quantities were provided by the AE and the critical cost times were adjusted to reflect reasonable cost as if this were a bid item. As further details are developed, the major line item costs will be refined which could significantly affect the cost.  | Possible | Significant         |
|      | 0                                 | Reliability and number of key quotes? |                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                              | Unlikely | Negligible          |
|      | 0                                 | Reliability and number of key quotes? |                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                              | Unlikely | Negligible          |
|      | Remaining Construction            | Reliability and number of key quotes? | None.                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                              | Unlikely | Negligible          |
|      | Planning, Engineering, & Design   | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to<br>establish costs and are relative to contractor markups and assignment,<br>quantities, crews and productivities, quotes and historical cost data. Cost is<br>based on current pricing. |                                                                                                                                                                                                                                                                                                                                                                              | Possible | Significant         |
| ı    |                                   | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to establish costs and are relative to contractor markups and assignment, quantities, creves and productivities, quotes and historical cost data. Cost is                                   |                                                                                                                                                                                                                                                                                                                                                                              | Possible | Marginal            |

| External | External Project Risks             |                                       |                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                     |          |                    |     |  |  |  |  |
|----------|------------------------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------|-----|--|--|--|--|
|          |                                    | 1                                     | T                                                                                                                                                                                                                                          | 1                                                                                                                                                                                                                                                                                                                                                   | Max Pote | ential Cost Growth | 40% |  |  |  |  |
| EX-1     | 1 Mobilization -<br>Demobilization | Potential for severe adverse weather? | External risks such as failure to obtain permits in a timely manner, political risks, delays or cancellation of funding sources could impact project costs. Potential for adverse weather.                                                 | Depending on the project schedule, weather is likely to affect the project schedule. However, the construction of the basin would be part of the critical path so the impact would have a marginal effect.                                                                                                                                          | Possible | Marginal           | 1   |  |  |  |  |
| EX-2     | 2 Chainlink Fence                  | Potential for severe adverse weather? | External risks such as failure to obtain permits in a timely manner, political risks, delays or cancellation of funding sources could impact project costs. Potential for adverse weather.                                                 | Depending on the project schedule, weather is likely to affect the project schedule. However, the construction of the basin would be part of the critical path so the impact would have a marginal effect.                                                                                                                                          | Possible | Marginal           | 1   |  |  |  |  |
| EX-3     | 3 Dewatering                       | Potential for severe adverse weather? | External risks such as failure to obtain permits in a timely manner, political risks, delays or cancellation of funding sources could impact project costs. Potential for adverse weather.                                                 | Depending on the project schedule, weather is likely to affect the project schedule. However, the construction of the basin would be part of the critical path so the impact would have a marginal effect.                                                                                                                                          | Possible | Significant        | 2   |  |  |  |  |
| EX-4     | 4 Road Crossing                    | Potential for severe adverse weather? | External risks such as failure to obtain permits in a timely manner, political risks, selays or cancellation of funding sources could impact project costs. Potential for adverse weather.                                                 | Depending on the project schedule, weather is likely to affect the project schedule. However, the construction of the basin would be part of the critical path so the impact would have a marginal effect.                                                                                                                                          | Possible | Marginal           | 1   |  |  |  |  |
| EX-5     | 5 Grading                          | Potential for severe adverse weather? | External risks such as failure to obtain permits in a timely manner, political risks, selays or cancellation of funding sources could impact project costs. Potential for adverse weather.                                                 | Depending on the project schedule, weather is likely to affect the project schedule. However, the construction of the basin would be part of the critical path so the impact would have a marginal effect.                                                                                                                                          | Possible | Significant        | 2   |  |  |  |  |
| EX-6     | 6 Post-Construction<br>Monitoring  | Potential for severe adverse weather? | External risks such as failure to obtain permits in a timely manner, political risks, delays or cancellation of funding sources could impact project costs. Potential for adverse weather.                                                 | Depending on the project schedule, weather is likely to affect the project schedule. However, the construction of the basin would be part of the critical path so the impact would have a marginal effect.                                                                                                                                          | Possible | Negligible         | 0   |  |  |  |  |
| EX-7     | 7 Drainage                         | Potential for severe adverse weather? | External risks such as failure to obtain permits in a timely manner, political<br>risks, delays or cancellation of funding sources could impact project costs.<br>Ability to establish easement agreements. Potential for adverse weather. | Depending on the project schedule, weather is likely to affect the project schedule. However, the construction of the basin would be part of the critical path so the impract would have a marginal effect. The ability to establish easements which may be needed to corvey the discharge to the lagoon may have a marginal effect on the project. | Possible | Significant        | 2   |  |  |  |  |
| EX-8     | 8 Driveway                         | Potential for severe adverse weather? | External risks such as failure to obtain permits in a timely manner, political<br>risks, delays or cancellation of funding sources could impact project costs.<br>Ability to establish easement agreements. Portanial for adverse weather. | Depending on the project schedule, weather is likely to affect the project schedule. However, the construction of the basin would be part of the critical path so the impract would have a marginal effect. The ability to establish easements which may be needed to convey the discharge to the lagoon may have a marginal effect on the project. | Possible | Significant        | 2   |  |  |  |  |
| EX-9     | 9 Basin                            | Potential for severe adverse weather? | External risks such as failure to obtain permits in a timely manner, political risks, eldeys or cancellation of funding sources could impact project costs. Ability to establish easement agreement. Potential for impact pro              | Depending on the project schedule, weather is likely to affect the project schedule. However, the construction of the basin would be part of the critical easements which may be needed to convey the discharge to the lagoon may have a marginal effect on the project.                                                                            | Possible | Significant        | 2   |  |  |  |  |
| EX-10    | 0                                  | Potential for severe adverse weather? |                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                     | Unlikely | Negligible         | 0   |  |  |  |  |
| EX-11    | 0                                  | Potential for severe adverse weather? |                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                     | Unlikely | Negligible         | 0   |  |  |  |  |
| EX-12    | Remaining Construction             | Potential for severe adverse weather? | None.                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                     | Unlikely | Negligible         | 0   |  |  |  |  |
| EX-13    | Planning, Engineering, & Design    | Potential for severe adverse weather? | External risks such as political, funding sources could impact project costs over time.                                                                                                                                                    | Changes to permitting and other requirements could result in added coordination and design efforts.                                                                                                                                                                                                                                                 | Possible | Significant        | 2   |  |  |  |  |
|          |                                    | Potential for severe adverse weather? | Potential for adverse weather.                                                                                                                                                                                                             | Severe weather could impact the grading of the site and impact the schedule.                                                                                                                                                                                                                                                                        | Possible | Significant        | 2   |  |  |  |  |

# Saipan Lagoon Ecosystem Restoration - Alt 3 (C2Q0A1) Feasibility (Alternatives) Abbreviated Risk Analysis

|                                       |                                                 |                              |              |                 |                      |                     | <u>Potential</u>         | Risk Areas            | i       |   |   |                                |                                     |                            |
|---------------------------------------|-------------------------------------------------|------------------------------|--------------|-----------------|----------------------|---------------------|--------------------------|-----------------------|---------|---|---|--------------------------------|-------------------------------------|----------------------------|
|                                       | <sup>1</sup> Mobilization .<br>Demobilization . | <sup>2</sup> Chainlink Fence | 3 Dewalering | 4 Road Crossing | <sup>5</sup> Grading | 6 Post-Construction | <sup>&gt; Drainage</sup> | <sup>8</sup> Driveway | 9 Basin | 0 | 0 | Remaining<br>Construction Ites | Planning,<br>Engineering,<br>Design | Construction<br>Management |
| Project Scope Growth                  | 1                                               | 2                            | 2            | -               | 3                    | -                   | 3                        | -                     | 3       | - | - | -                              | 2                                   | 2                          |
| Acquisition Strategy                  | -                                               | -                            | -            | -               | -                    | -                   | -                        | -                     | -       | - | - | -                              | -                                   | -                          |
| Construction Elements                 | 2                                               | -                            | 2            | 1               | 2                    | -                   | 2                        | 1                     | 2       | - | - | -                              | -                                   | -                          |
| Quantities for Current<br>Scope       | 2                                               | 2                            | 1            | -               | 3                    | -                   | 2                        | -                     | 2       | - | - | -                              | -                                   | -                          |
| Specialty Fabrication or<br>Equipment | 1                                               | -                            | 1            | -               | 2                    | -                   | 2                        | -                     | -       | - | - | -                              | -                                   | -                          |
| Cost Estimate<br>Assumptions          | 2                                               | 2                            | 2            | 2               | 2                    | 1                   | 2                        | 2                     | 2       | - | - | -                              | 2                                   | 1                          |
| External Project Risks                | 1                                               | 1                            | 2            | 1               | 2                    | -                   | 2                        | 2                     | 2       | - | - | -                              | 2                                   | 2                          |

**Typical Risk Elements** 

#### \*\*\*\* TOTAL PROJECT COST SUMMARY \*\*\*\*

Saipan Lagoon Ecosystem Restoration PROJECT:

PROJECT NO:

LOCATION: Saipan Lagoon, Sasipan

DISTRICT: NWW WALLA WALLA

PREPARED: 6/18/2013

CHIEF, COST ENGINEERING, Gary F. Yamauchi POC:

This Estimate reflects the scope and schedule in report; CAP Feasibility STUDY - ECOSYSTEM RESTORATION REPORT

| Civil                            | Works Work Breakdown Structure                       | ESTIMATED COST            |                             |                          |                             | PROJECT FIRST COST (Constant<br>Dollar Basis) |                             |                | TOTAL PROJECT COST (FULLY FUNDED) |                                               |   |                    | <b>'</b> )     |                           |
|----------------------------------|------------------------------------------------------|---------------------------|-----------------------------|--------------------------|-----------------------------|-----------------------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------------------------|---|--------------------|----------------|---------------------------|
|                                  |                                                      |                           |                             |                          |                             | 11 -                                          | gram Year (Brective Price L |                | 2016<br>1 OCT 15                  |                                               |   |                    |                |                           |
| WBS<br><u>NUMBER</u><br><b>A</b> | Civil Works Feature & Sub-Feature Description B      | COST<br>(\$K)<br><b>C</b> | CNTG<br>_(\$K)_<br><b>D</b> | CNTG<br>_(%)<br><i>E</i> | TOTAL<br>_(\$K)<br><i>F</i> | ESC<br>(%)<br><b>G</b>                        | COST<br>(\$K)<br>H          | CNTG<br>_(\$K) | TOTAL<br>(\$K)<br>J               | Spent Thru:<br>10/1/2012<br>(\$K)<br><b>K</b> | L | COST<br>(\$K)<br>M | CNTG<br>_(\$K) | FULL<br>(\$K)<br><b>O</b> |
| 03<br>03                         | RESERVOIRS RESERVOIRS (Post Construction Monitoring) | \$1,514<br>\$1,862        | \$451<br>\$554              | 30%<br>30%               | \$1,964.57<br>\$2,416.13    | 4.4%<br>4.4%                                  | \$1,581<br>\$1,944          | \$471<br>\$579 | \$2,052<br>\$2,523                |                                               |   | \$1,611<br>\$2,106 | \$479<br>\$627 | \$2,091<br>\$2,733        |
| 19                               | BUILDINGS, GROUNDS & UTILITIES                       | \$4,272                   | \$1,271                     | 30%                      | \$5,543.35                  | 4.4%                                          | \$4,461                     | \$1,328        | \$5,789                           |                                               |   | \$4,546            | \$1,353        | \$5,899                   |
|                                  | CONSTRUCTION ESTIMATE TOTALS:                        | \$7,648                   | \$2,276                     |                          | \$9,924.04                  | 4.4%                                          | \$7,987                     | \$2,377        | \$10,363                          |                                               |   | \$8,263            | \$2,459        | \$10,723                  |
| 01                               | LANDS AND DAMAGES                                    | \$1,945                   | \$235                       | 12%                      | \$2,180.15                  | 4.4%                                          | \$2,031                     | \$246          | \$2,277                           |                                               |   | \$2,041            | \$247          | \$2,288                   |
| 22                               | FEASIBILITY STUDY (CAP studies)                      |                           |                             |                          |                             |                                               |                             |                |                                   | \$1,483                                       |   |                    |                | \$1,483                   |
| 30                               | PLANNING, ENGINEERING & DESIGN                       | \$2,061                   | \$436                       | 21%                      | \$2,496.70                  | 6.5%                                          | \$2,196                     | \$464          | \$2,660                           |                                               |   | \$2,207            | \$467          | \$2,674                   |
| 31                               | CONSTRUCTION MANAGEMENT                              | \$690                     | \$131                       | 19%                      | \$821.31                    | 6.5%                                          | \$735                       | \$140          | \$875                             |                                               |   | \$766              | \$146          | \$912                     |
|                                  | PROJECT COST TOTALS:                                 | \$12,344                  | \$3,078                     | 25%                      | \$15,422.20                 |                                               | \$12,949                    | \$3,226        | \$16,175                          | \$1,483                                       |   | \$13,278           | \$3,318        | \$18,079                  |

| Mandatory by Regulation | CHIEF, COST ENGINEERING, Gary F. Yamauchi |
|-------------------------|-------------------------------------------|
| Mandatory by Regulation | PROJECT MANAGER, Milton Yoshimoto         |
| Mandatory by Regulation | CHIEF, REAL ESTATE, Craig H. Nakano       |
|                         | CHIEF, PLANNING, Anthony J. Paresa        |
|                         | CHIEF, ENGINEERING, Todd C. Barnes        |
|                         | CHIEF, OPERATIONS, Michael F. Wong        |
|                         | CHIEF, CONSTRUCTION, Louis Muzzarini      |
|                         | CHIEF, CONTRACTING, Roger David Williams  |
|                         | CHIEF, PM-PB, Roxanne E. Iseri            |
|                         | CHIEF, DPM, Milton Yoshimoto              |

ESTIMATED FEDERAL COST: 65% \$10,787 ESTIMATED NON-FEDERAL COST: \$5,809

FEASIBILITY FEDERAL COST: \$792 FEASIBILITY NON-FEDERAL COST: \$692 **ESTIMATED TOTAL PROJECT COST:** \$18,079

#### \*\*\*\* TOTAL PROJECT COST SUMMARY \*\*\*\*

#### \*\*\*\* CONTRACT COST SUMMARY \*\*\*\*

PROJECT: Saipan Lagoon Ecosystem Restoration

DISTRICT: NWW WALLA WALLA

POC: CHIEF, COST ENGINEERING, Gary F. Yamauchi

PREPARED: 6/18/2013

LOCATION: Saipan Lagoon, Sasipan
This Estimate reflects the scope and schedule in report; CAP Feasibility STUDY - ECOSYSTEM RESTORATION REPORT

|               | WBS Structure                       | ESTIMATED COST |                                |          | PROJECT FIRST COST (Constant Dollar Basis) |       |                             | TOTAL PROJECT COST (FULLY FUNDED) |                  |             |          |          |               |               |
|---------------|-------------------------------------|----------------|--------------------------------|----------|--------------------------------------------|-------|-----------------------------|-----------------------------------|------------------|-------------|----------|----------|---------------|---------------|
|               |                                     |                | nate Prepared<br>ive Price Lev |          | 3/22/2013<br>10/1/2012                     |       | n Year (Bud<br>re Price Lev |                                   | 2016<br>1 OCT 15 |             |          |          |               |               |
|               |                                     |                | RI                             | SK BASED | )                                          |       |                             |                                   |                  |             |          |          |               |               |
| WBS           | Civil Works                         | COST           | CNTG                           | CNTG     | TOTAL                                      | ESC   | COST                        | CNTG                              | TOTAL            | Mid-Point   | INFLATED | COST     | CNTG          | FULL          |
| <u>NUMBER</u> | Feature & Sub-Feature Description   | (\$K)          | (\$K)                          | (%)      | (\$K)                                      | (%)   | (\$K)                       | (\$K)                             | (\$K)            | <u>Date</u> | (%)      | (\$K)    | (\$K)         | (\$K)         |
| Α             | В                                   | С              | D                              | E        | F                                          | G     | Н                           | 1                                 | J                | P           | L        | М        | N             | 0             |
| 00            | PHASE 1 or CONTRACT 1               |                | 0                              |          | <b>*</b>                                   |       |                             | 0.1-1                             |                  |             |          |          | 4.70          | 40.004        |
| 03<br>03      | RESERVOIRS                          | \$1,514        | \$451                          | 29.8%    | \$1,965                                    | 4.4%  | \$1,581                     | \$471                             | \$2,052          | 2016Q2      | 1.9%     | \$1,611  | \$479         | \$2,091       |
| 03            | RESERVOIRS                          | \$1,862        | \$554                          | 29.8%    | \$2,416                                    | 4.4%  | \$1,944                     | \$579                             | \$2,523          | 2019Q3      | 8.3%     | \$2,106  | \$627         | \$2,733       |
| 10            | (Post Construction Monitoring)      | 04.070         | 04.074                         | 00.00/   | <b>05.540</b>                              | 4.40/ | 04.404                      | 04.000                            | <b>#5 700</b>    | 004000      | 4.00/    | 04.540   | <b>#4.050</b> | <b>#F 000</b> |
| 19            | BUILDINGS, GROUNDS & UTILITIES      | \$4,272        | \$1,271                        | 29.8%    | \$5,543                                    | 4.4%  | \$4,461                     | \$1,328                           | \$5,789          | 2016Q2      | 1.9%     | \$4,546  | \$1,353       | \$5,899       |
|               | CONSTRUCTION ESTIMATE TOTALS:       |                | \$2,276                        | 29.8%    | \$9,924                                    | -     | \$7,987                     | \$2,377                           | \$10,363         |             |          | \$8,263  | \$2,459       | \$10,723      |
|               |                                     |                |                                |          |                                            |       | . ,                         | . ,                               |                  |             |          | . ,      |               |               |
| 01            | LANDS AND DAMAGES                   | \$1,945        | \$235                          | 12.1%    | \$2,180                                    | 4.4%  | \$2,031                     | \$246                             | \$2,277          | 2015Q3      | 0.5%     | \$2,041  | \$247         | \$2,288       |
| 30            | PLANNING, ENGINEERING & DESIGN      |                |                                |          |                                            |       |                             |                                   |                  |             |          |          |               |               |
| 3.10%         | Project Management                  | \$237          | \$50                           | 21.1%    | \$287                                      | 6.5%  | \$253                       | \$53                              | \$306            | 2015Q2      |          | \$253    | \$53          | \$306         |
| 14.37%        | Planning & Environmental Compliance | \$1,099        | \$232                          | 21.1%    | \$1,331                                    | 6.5%  | \$1,171                     | \$248                             | \$1,419          | 2015Q2      |          | \$1,171  | \$248         | \$1,419       |
| 3.19%         | Engineering & Design                | \$244          | \$52                           | 21.1%    | \$296                                      | 6.5%  | \$260                       | \$55                              | \$315            | 2015Q2      |          | \$260    | \$55          | \$315         |
| 0.65%         | Engineering Tech Review ITR & VE    | \$50           | \$11                           | 21.1%    | \$61                                       | 6.5%  | \$53                        | \$11                              | \$65             | 2015Q2      |          | \$53     | \$11          | \$65          |
| 0.33%         | Contracting & Reprographics         | \$25           | \$5                            | 21.1%    | \$30                                       | 6.5%  | \$27                        | \$6                               | \$32             | 2015Q2      |          | \$27     | \$6           | \$32          |
| 1.31%         | Engineering During Construction     | \$100          | \$21                           | 21.1%    | \$121                                      | 6.5%  | \$107                       | \$23                              | \$129            | 2016Q2      | 4.2%     | \$111    | \$23          | \$134         |
| 2.00%         | Planning During Construction        | \$153          | \$32                           | 21.1%    | \$185                                      | 6.5%  | \$163                       | \$34                              | \$197            | 2016Q2      | 4.2%     | \$170    | \$36          | \$206         |
| 2.00%         | Project Operations                  | \$153          | \$32                           | 21.1%    | \$185                                      | 6.5%  | \$163                       | \$34                              | \$197            | 2015Q2      |          | \$163    | \$34          | \$197         |
| 31            | CONSTRUCTION MANAGEMENT             |                |                                |          |                                            |       |                             |                                   |                  |             |          |          |               |               |
| 4.52%         | Construction Management             | \$346          | \$66                           | 19.0%    | \$412                                      | 6.5%  | \$369                       | \$70                              | \$439            | 2016Q2      | 4.2%     | \$384    | \$73          | \$457         |
| 2.00%         | Project Operation:                  | \$153          | \$29                           | 19.0%    | \$182                                      | 6.5%  | \$163                       | \$31                              | \$194            | 2016Q2      | 4.2%     | \$170    | \$32          | \$202         |
| 2.50%         | Project Management                  | \$191          | \$36                           | 19.0%    | \$227                                      | 6.5%  | \$204                       | \$39                              | \$242            | 2016Q2      | 4.2%     | \$212    | \$40          | \$252         |
|               | CONTRACT COST TOTALS:               | \$12,344       | \$3,078                        |          | \$15,422                                   | -     | \$12,949                    | \$3,226                           | \$16,175         |             | =        | \$13,278 | \$3,318       | \$16,596      |

#### **Abbreviated Risk Analysis**

Project (less than \$40M): Saipan Lagoon Ecosystem Restoration - Alt 4 (C2Q2A' Project Development Stage: Feasibility (Alternatives)

Risk Category: Moderate Risk: Typical Project or Possible Life Safety

Total Construction Contract Cost = \$ 7,648,021

|    | <u>CWWBS</u>                         | Feature of Work                      | <u>Cc</u> | ontract Cost | % Contingency | <u>\$</u> | Contingency  | <u>Total</u> |
|----|--------------------------------------|--------------------------------------|-----------|--------------|---------------|-----------|--------------|--------------|
|    | 01 LANDS AND DAMAGES                 | Real Estate                          | \$        | 1,944,800    | 12.09%        | \$        | 235,099 \$   | 2,179,899.09 |
| 1  | 03 RESERVOIRS                        | 1 Mobilization - Demobilization      | \$        | 168,851      | 24.92%        | \$        | 42,075 \$    | 210,926.12   |
| 2  | 03 RESERVOIRS                        | 2 Chainlink Fence                    | \$        | 226,141      | 22.18%        | \$        | 50,148 \$    | 276,288.77   |
| 3  | 03 RESERVOIRS                        | 3 Dewatering                         | \$        | 274,018      | 28.96%        | \$        | 79,353 \$    | 353,371.04   |
| 4  | 03 RESERVOIRS                        | 4 Road Crossing                      | \$        | 70,708       | 15.14%        | \$        | 10,706 \$    | 81,413.84    |
| _5 | 03 RESERVOIRS                        | 5 Grading                            | \$        | 773,912      | 44.14%        | \$        | 341,586 \$   | 1,115,498.00 |
| 6  | 03 RESERVOIRS                        | 6 Post-Construction Monitoring       | \$        | 1,862,012    | 9.04%         | \$        | 168,255 \$   | 2,030,266.53 |
| 7  | 19 BUILDINGS, GROUNDS, AND UTILITIES | 7 Drainage                           | \$        | 1,185,241    | 41.42%        | \$        | 490,901 \$   | 1,676,142.39 |
| 8  | 19 BUILDINGS, GROUNDS, AND UTILITIES | 8 Driveway                           | \$        | 65,012       | 17.42%        | \$        | 11,327 \$    | 76,339.09    |
| 9  | 19 BUILDINGS, GROUNDS, AND UTILITIES | 9 Basin                              | \$        | 3,022,126    | 35.79%        | \$        | 1,081,744 \$ | 4,103,869.52 |
| 12 |                                      | Remaining Construction Items         | \$        | -            | 0.0% 0.00%    | \$        | - \$         | <u>-</u>     |
| 13 | 30 PLANNING, ENGINEERING, AND DESIGN | Planning, Engineering, & Design      | \$        | 2,061,000    | 21.14%        | \$        | 435,761 \$   | 2,496,760.51 |
| 14 | 31 CONSTRUCTION MANAGEMENT           | Construction Management              | \$        | 690,000      | 19.03%        | \$        | 131,330 \$   | 821,330.09   |
|    |                                      | Totals                               |           |              |               |           |              |              |
|    |                                      | Real Estate                          | \$        | 1,944,800    | 12.09%        | \$        | 235,099 \$   | 2,179,899.09 |
|    |                                      | Total Construction Estimate          | \$        | 7,648,021    | 29.76%        | \$        | 2,276,094 \$ | 9,924,115    |
|    |                                      | Total Planning, Engineering & Design |           | 2,061,000    | 21.14%        | \$        | 435,761 \$   | 2,496,761    |
|    |                                      | Total Construction Management        |           | 690,000      | 19.03%        | \$        | 131,330 \$   | 821,330      |
|    |                                      | Total                                | \$        | 12,343,821   |               | \$        | 3,078,284 \$ | 15,422,105   |

### **Abbreviated Risk Analysis**

# Saipan Lagoon Ecosystem Restoration - C2Q2A1 Feasibility

Meeting Date: 22-Mar-13

PDT Members (Typical Recommended)

Project Management: Milton Yoshimoto

Cost Estimator: Lana Murishige
Environmentalist: Sonia Shjesgadt
Environmentalist: Miya Akiba

Engineering & Design:
Engineering & Design:
Project Management:

Anson Murayama
Frank Camacho
Uyen Tran

## Saipan Lagoon Ecosystem Restoration - Alt 4 (C2Q2A1) Feasibility (Alternatives) Abbreviated Risk Analysis

Meeting Date: #######

Risk Level

| ery Likely | 2          | 3        | 4           | 5        | 5      |
|------------|------------|----------|-------------|----------|--------|
| Likely     | 1          | 2        | 3           | 4        | 5      |
| Possible   | 0          | - 1      | 2           | 3        | 4      |
| Unlikely   | 0          | 0        | 1           | 2        | 3      |
|            | Negligible | Marginal | Significant | Critical | Crisis |

| Risk<br>Element | Feature of Work                   | Concerns Pull Down Tab (ENABLE MACROS<br>THRU TRUST CENTER)<br>(Choose ALL that apply) | Concerns                                                                             | PDT Discussions & Conclusions (Include logic & iustification for choice of Likelihood & Impact)                                                                                                                                                               | Likelihood | Impact             | Risk<br>Level |
|-----------------|-----------------------------------|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------|---------------|
| Project S       | Scope Growth                      |                                                                                        |                                                                                      |                                                                                                                                                                                                                                                               |            |                    |               |
|                 |                                   |                                                                                        |                                                                                      |                                                                                                                                                                                                                                                               | Max Pot    | ential Cost Growth | 75%           |
| PS-1            | Mobilization - Demobilization     | Project accomplish intent?                                                             | Schedule is assumed and subject to change.                                           | A more detailed design will be required and the topo is anticipated to be out of date.                                                                                                                                                                        | Possible   | Marginal           | 1             |
| PS-2            | 2 Chainlink Fence                 | Potential for scope growth, added features and quantities?                             | Possible quantity differential if site limits change.                                |                                                                                                                                                                                                                                                               | Likely     | Marginal           | 2             |
| PS-3            | 3 Dewatering                      | Investigations sufficient to support design assumptions?                               | Schedule is assumed and subject to change. Soil report will be needed.               | A more detailed design will be required and the topo is anticipated to be out of date.                                                                                                                                                                        | Likely     | Marginal           | 2             |
| PS-4            | 4 Road Crossing                   | Investigations sufficient to support design assumptions?                               | Topo may not be most current thus affecting assumed locations of road and utilities. |                                                                                                                                                                                                                                                               | Possible   | Negligible         | 0             |
| PS-5            | 5 Grading                         | Design confidence?                                                                     | 10% conceptual design only. Existing topo may not be most current.                   | A more detailed design will be required and the topo is anticipated to be cut of date.                                                                                                                                                                        | Likely     | Significant        | 3             |
| PS-6            | 6 Post-Construction<br>Monitoring | Potential for scope growth, added features and quantities?                             | Additional monitoring may be required if performance standards aren't met.           | It is unlikely that there would be any changes after construction.                                                                                                                                                                                            | Unlikely   | Marginal           | 0             |
| PS-7            | 7 Drainage                        | Potential for scope growth, added features and quantities?                             | 10% conceptual design only. Condition of existing utilities may be different.        | A more detailed design will be required. The condition of the existing utilities is<br>unknown and the assumption was made that the existing utilities will convey all<br>the unoff from the watershed to the basin.                                          | Likely     | Significant        | 3             |
| PS-8            | 8 Driveway                        | Potential for scope growth, added features and quantities?                             | Topo may not be most current thus affecting assumed locations of road and utilities. |                                                                                                                                                                                                                                                               | Possible   | Negligible         | 0             |
| PS-9            | 9 Basin                           | Potential for scope growth, added features and quantities?                             | 10% conceptual design only. Condition of existing utilities may be different.        | A more detailed design will be required. The condition of the existing utilities is<br>unknown and the assumption was made that the existing utilities will convey all<br>the unoff from the watershed to the basin.                                          | Likely     | Significant        | 3             |
| PS-10           | 0                                 | Potential for scope growth, added features and quantities?                             |                                                                                      |                                                                                                                                                                                                                                                               | Unlikely   | Negligible         | 0             |
| PS-11           | 0                                 | Potential for scope growth, added features and quantities?                             |                                                                                      |                                                                                                                                                                                                                                                               | Unlikely   | Negligible         | 0             |
| PS-12           | Remaining Construction Items      | Potential for scope growth, added features and quantities?                             | None.                                                                                |                                                                                                                                                                                                                                                               | Unlikely   | Negligible         | 0             |
| PS-13           | Planning, Engineering, & Design   | Potential for scope growth, added features and quantities?                             | Need to provide 100% Design.                                                         | A more detailed design will be required and the topo is anticipated to be out of date. The condition of the existing utilities is unknown and the assumption was made that the existing utilities will convey all the runoff from the watershed to the basin. | Likely     | Marginal           | 2             |
| PS-14           | Construction Management           | Potential for scope growth, added features and quantities?                             | Need to provide 100% Design.                                                         | A more detailed design will be required and the topo is anticipated to be out of date. The condition of the existing utilities is unknown and the assumption was made that the existing utilities will convey all the runoff from the watershed to the basin. | Likely     | Marginal           | 2             |

| Acquisit   | on Strategy                        | T                                                                               |                                                                                                                                           |                                                                                                                                         | Max Pot  | ential Cost Growth | 30 |
|------------|------------------------------------|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------|----|
| AS-1       | 1 Mobilization -<br>Demobilization | Contracting plan firmly established?                                            |                                                                                                                                           |                                                                                                                                         | Unlikely | Negligible         | 0  |
|            |                                    |                                                                                 |                                                                                                                                           |                                                                                                                                         | Unlikely | Negligible         |    |
| S-2        | 2 Chainlink Fence                  | Contracting plan firmly established?                                            |                                                                                                                                           |                                                                                                                                         | Unlikely | Marginal           | 0  |
| S-3        | 3 Dewatering                       | Contracting plan firmly established?                                            | Topo may not be most current thus affecting assumed locations of road and utilities for essement purposes.                                | Due to unknown contract schedule, plans may be altered.                                                                                 | Unlikely | Negligible         | 0  |
| S-4        | 4 Road Crossing                    | Contracting plan firmly established?                                            |                                                                                                                                           |                                                                                                                                         | Unlikely | Marginal           | 0  |
| S-5        | 5 Grading 6 Post-Construction      | Contracting plan firmly established?                                            | Contracting plan established.                                                                                                             | Due to unknown contract schedule, plans may be altered.  The reasonable assumption is that the prime contractor will be performing most | Unlikely | Marginal           | 0  |
| 3-6        | Monitoring                         | Contracting plan firmly established?                                            | Contract acquisition strategy is assumed as full and open, invitation for bid.                                                            | of the work.                                                                                                                            | Unlikely | Marginal           | 0  |
| S-7<br>S-8 | 7 Drainage<br>8 Driveway           | Contracting plan firmly established?  Contracting plan firmly established?      | Contracting plan established.  Topo may not be most current thus affecting assumed locations of road and utilities for essement purposes. | Due to unknown contract schedule, plans may be altered.                                                                                 | Unlikely | Negligible         | 0  |
|            | 9 Basin                            | Contracting plan firmly established?                                            | Contracting plan established.                                                                                                             | Due to unknown contract schedule, plans may be altered.                                                                                 | Unlikely | Marginal           |    |
| -10        | 0                                  | Contracting plan firmly established?                                            |                                                                                                                                           |                                                                                                                                         | Unlikely | Negligible         |    |
| -11        | 0                                  | Contracting plan firmly established?                                            |                                                                                                                                           |                                                                                                                                         | Unlikely | Negligible         |    |
| -12        | Remaining Construction             | Contracting plan firmly established?                                            | None                                                                                                                                      |                                                                                                                                         | Unlikely | Negligible         |    |
| -13        | Planning, Engineering, & Design    | Contracting plan immy established?      Contracting plan firmly established?    | None                                                                                                                                      |                                                                                                                                         | Unlikely | Negligible         |    |
|            |                                    | Contracting plan inimity established?      Contracting plan firmly established? | y manus.                                                                                                                                  |                                                                                                                                         | Unlikely | Negligible         |    |

| Negrotation of process and public services of process and public services of process and public services of process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and process and proces | Constru | ction Elements           |                                                 |                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                    | Max Po   | tential Cost Growth | 25%   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------------------|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------------------|-------|
| Light Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the  |         |                          |                                                 |                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                    |          |                     | 20 /0 |
| See 2 County of Academic administrative trains investigate interesting of the control of page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the page of the p | CE-1    |                          | Accelerated schedule or harsh weather schedule? | requires special mobilization. There is a possibility for major construction<br>modifications if special equipment or subcontractors need to be transported | account. The likelihood of the anticipated soils type to change is very unlikely,<br>however in the case an unanticipated soil type is found the impact would have<br>a marginal effect. Fuel costs are likely to fluctuate, however the fuel costs are a                                                                          | Likely   | Marginal            | 2     |
| Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application   Application      |         |                          |                                                 |                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                    | Unlikely | Negligible          |       |
| Magnitude properties of the control of properties of the control of the control of properties of the control of the control of the control of properties of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of  | CE-2    | 2 Chainlink Fence        | Accelerated schedule or harsh weather schedule? |                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                    |          |                     | 0     |
| *** Accidenced category is a functional or hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weather schools of hard weathe | CE-3    | 3 Dewatering             | Accelerated schedule or harsh weather schedule? | requires special mobilization. There is a possibility for major construction modifications if special equipment or subcontractors need to be transported.   | account. The likelihood of the anticipated soils type to change is very unlikely,<br>however in the case an unanticipated soil type is found the impact would have<br>a marcinal effect. Fuel costs are likely to fluctuate, however the fuel costs are a                                                                          | Likely   | Marginal            | 2     |
| Add in good was not preferred by the study, only recently was then into control or special engineers or advantaged softwards for head weather strucked?  CE 6 October - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule or head weather strucked?  Page Complete - Accelerated schedule o |         |                          |                                                 |                                                                                                                                                             | Fuel costs are likely to fluctuate, however the fuel costs are a small percentage                                                                                                                                                                                                                                                  | Likely   | Negligible          |       |
| Mary desired and gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradient processes of gradi | CE-4    | 4 Road Crossing          | Accelerated schedule or harsh weather schedule? | Fuel for equipment.                                                                                                                                         | to the price of the project as a whole.                                                                                                                                                                                                                                                                                            |          |                     | 1     |
| Fig. Combination  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committed  Fig. Committ | CE-5    | 5 Grading                | Accelerated schedule or harsh weather schedule? | modifications if special equipment or subcontractors need to be transported                                                                                 | account. The likelihood of the anticipated soils type to change is very unlikely,<br>however in the case an unanticipated soil type is found the impact would have<br>a marginal effect. Fuel costs are likely to fluctuate, however the fuel costs are a                                                                          | Likely   | Marginal            | 2     |
| A subsequent was more performed for this stady, poly resource and below into account. The silenthood of the stady, poly resource was below into account. The silenthood of the stady, poly resource was below into account. The silenthood of the stady, poly resource was below into account. The silenthood of the stady, poly resource was below into account. The silenthood of the stady, poly resource was below into account. The silenthood of the stady, poly resource was below into account. The silenthood of the stady was below the bed coals are amurpled when it is compared to the coals of the proper that a window and the proper that is coals of the proper that a window and the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on the proper that is coals on | CER     |                          | Accelerated schedule or barsh weather schedule? | Project complexity of these items may impact construction bid, site                                                                                         | The listed cost items are finish simple. Any sink is likely low                                                                                                                                                                                                                                                                    | Unlikely | Negligible          | 0     |
| EE-8 8 Driveway - Accelerated schedule or harsh weather schedule? Fuel for equipment.  Soil conditions. Location of project requires special mobilization. Fuel for analysis and analysis of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project of the project  | CE-7    |                          | Accelerated schedule or harsh weather schedule? | Soil conditions. Location of project requires special mobilization. Fuel for equipment.                                                                     | A soils report was never performed for this study, only research was taken into account. The likelihood of the anticipated soils type to change is very unlikely, however in the case an unanticipated soil type is found the impact would have a marginal effect. Fuel costs are leafly to fuctuate, however the fuel costs are a | Likely   | Marginal            |       |
| A soil report was never performed for this study, only research was taken into account. The like although of the anticipated soil type is found the impact would have required an unanticipated soil type is found the impact would have required to the project requires special mobilization. Fuel for equire special mobilization. Fuel for equire special mobilization. Fuel for equire special mobilization in the project size as a whole.  Unakely Negligible  CE-10 0 **Accelerated schedule or harsh weather schedule?*  Unakely Negligible  CE-11 0 **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  Unakely Negligible  CE-12 Remaining Construction **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  **Accelerated schedule or harsh weather schedule?*  |         |                          |                                                 |                                                                                                                                                             | Fuel costs are likely to fluctuate, however the fuel costs are a small percentage                                                                                                                                                                                                                                                  | Likely   | Negligible          |       |
| CE-0 9 Basin *Accelerated schedule or harsh weather schedule? Soil conditions. Location of project requires special mobilization. Fuel for equipment.  CE-10 0 *Accelerated schedule or harsh weather schedule? Unlikely Negligible  CE-11 0 *Accelerated schedule or harsh weather schedule?  CE-12 Remaining Construction  CE-13 Design *Accelerated schedule or harsh weather schedule? None.  CE-13 Design *Accelerated schedule or harsh weather schedule? None.  CE-13 Design *Accelerated schedule or harsh weather schedule? None.  CE-14 Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CE-8    | 8 Driveway               | Accelerated schedule or harsh weather schedule? | Fuel for equipment.                                                                                                                                         | to the price of the project as a whole.                                                                                                                                                                                                                                                                                            |          |                     | 1     |
| CE-10 0 *Accelerated schedule or harsh weather schedule?  Unlikely Negligible  CE-11 0 *Accelerated schedule or harsh weather schedule?  Remaining Construction terms *Accelerated schedule or harsh weather schedule?  None.  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | CE-9    | 9 Basin                  | Accelerated schedule or harsh weather schedule? | Soil conditions. Location of project requires special mobilization. Fuel for squipment.                                                                     | account. The likelihood of the anticipated soils type to change is very unlikely,<br>however in the case an unanticipated soil type is found the impact would have<br>a marginal effect. Fuel costs are likely to fluctuate, however the fuel costs are a                                                                          | Likely   | Marginal            | 2     |
| CE-11 0 *Accelerated schedule or harsh weather schedule?  CE-12 Remaining Construction lems  *Accelerated schedule or harsh weather schedule? None.  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CF-10   | 0                        | Accelerated schedule or harsh weather schedule? |                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                    | Unlikely | Negligible          | 0     |
| CE-11 0 *Accelerated schedule or harsh weather schedule?  Unlikely Negligible  Remaining Construction herns *Accelerated schedule or harsh weather schedule? None.  Unlikely Negligible  Planning, Engineering, & *Accelerated schedule or harsh weather schedule? None.  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | JL 10   |                          |                                                 |                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                    |          |                     |       |
| Remaining Construction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | CE-11   | 0                        | Accelerated schedule or harsh weather schedule? |                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                    | Unlikely | Negligible          | 0     |
| CE-13 Planning, Engineering, & Accelerated schedule or harsh weather schedule? None.  Unlikely Negligible  Unlikely Negligible  Unlikely Negligible                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | CF-12   |                          | Accelerated schedule or harsh weather schedule? | None                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                    | Unlikely | Negligible          | 0     |
| CE-13 Design • Accelerated schedule or harsh weather schedule? None.  Unlikely Negligible                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |         | Planning, Engineering, & |                                                 | lavoue.                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                    | Unlikely | Negligible          |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CE-13   | Design                   | Accelerated schedule or harsh weather schedule? | None.                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                    |          |                     | 0     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CE-14   | Construction Management  | Accelerated schedule or harsh weather schedule? | None.                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                    | Unlikely | Negligible          | 0     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ,       | - management             |                                                 | •                                                                                                                                                           | •                                                                                                                                                                                                                                                                                                                                  |          |                     |       |

| Quantitie | Quantities for Current Scope      |                                                         |                                                                                           |                                                                                                                                                                   |          |                    |     |  |
|-----------|-----------------------------------|---------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------|-----|--|
|           |                                   |                                                         | I                                                                                         | I                                                                                                                                                                 | Max Pot  | ential Cost Growth | 20% |  |
| Q-1       | Mobilization -     Demobilization | Level of confidence based on design and assumptions?    | Topo may not be most current thus affecting the grading quantities. Design is conceptual. | The topo is anticipated to be out of date, therefore the grading quantities are likely to change but should only change to have a marginal impact to the project. | Likely   | Marginal           | 2   |  |
| Q-2       | 2 Chainlink Fence                 | Level of confidence based on design and assumptions?    | Location of properties on topo may not be most current affecting perimeter locations.     | The topo is anticipated to be out of date, therefore the grading quantities are likely to change but should only change to have a marginal impact to the project. | Likely   | Marginal           | 2   |  |
| Q-3       | 3 Dewatering                      | Level of confidence based on design and assumptions?    | Topo may not be most current thus affecting the grading quantities. Design is conceptual. | The topo is anticipated to be out of date, therefore the grading quantities are likely to change but should only change to have a marginal impact to the project. | Likely   | Negligible         | 1   |  |
| Q-4       | 4 Road Crossing                   | Level of confidence based on design and assumptions?    |                                                                                           |                                                                                                                                                                   | Unlikely | Negligible         | 0   |  |
| Q-5       | 5 Grading                         | Level of confidence based on design and assumptions?    | Topo may not be most current thus affecting the grading quantities. Design is conceptual. | The topo is anticipated to be out of date, therefore the grading quantities are likely to change but should only change to have a marginal impact to the project. | Likely   | Significant        | 3   |  |
| Q-6       | 6 Post-Construction<br>Monitoring | Level of confidence based on design and assumptions?    | As design evolves quantities on current project scope may change due to refinement.       | It is unlikely that there would be any changes after construction.                                                                                                | Unlikely | Marginal           | 0   |  |
| Q-7       | 7 Drainage                        | Level of confidence based on design and assumptions?    | Design is conceptual.                                                                     | With a complete design infrastructure quantities may change slightly.                                                                                             | Likely   | Marginal           | 2   |  |
| Q-8       | 8 Driveway                        | Level of confidence based on design and<br>assumptions? |                                                                                           |                                                                                                                                                                   | Unlikely | Negligible         | 0   |  |
| Q-9       | 9 Basin                           | Level of confidence based on design and assumptions?    | Design is conceptual.                                                                     | With a complete design infrastructure quantities may change slightly.                                                                                             | Likely   | Marginal           | 2   |  |
| Q-10      | 0                                 | Level of confidence based on design and<br>assumptions? |                                                                                           |                                                                                                                                                                   | Unlikely | Negligible         | 0   |  |
| Q-11      | 0                                 | Level of confidence based on design and assumptions?    |                                                                                           |                                                                                                                                                                   | Unlikely | Negligible         | 0   |  |
| Q-12      | Remaining Construction            | Level of confidence based on design and assumptions?    | None.                                                                                     |                                                                                                                                                                   | Unlikely | Negligible         | 0   |  |
| Q-13      | Planning, Engineering, & Design   | Level of confidence based on design and assumptions?    | None.                                                                                     |                                                                                                                                                                   | Unlikely | Negligible         | 0   |  |
|           | Construction Management           | Level of confidence based on design and                 | None.                                                                                     |                                                                                                                                                                   | Unlikely | Negligible         | 0   |  |

| Specialty | y Fabrication or Equipn            | nent                                                            |                                                                                                                                                    |                                                                                                                                                                                                                                                | Max Pot  | ential Cost Growth | 75% |
|-----------|------------------------------------|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------|-----|
| FE-1      | 1 Mobilization -<br>Demobilization | Unusual parts, material or equipment manufactured or installed? | Any specialized fabrication could impact cost due to change of material costs, complex designs, sole source fabrications that are not competitive. |                                                                                                                                                                                                                                                | Possible | Marginal           | 1   |
| FE-2      | 2 Chainlink Fence                  | Unusual parts, material or equipment manufactured or installed? |                                                                                                                                                    |                                                                                                                                                                                                                                                | Unlikely | Marginal           | 0   |
| FE-3      | 3 Dewatering                       | Unusual parts, material or equipment manufactured or installed? | Installation of the basin inlet and outlet.                                                                                                        | A more detailed design of the basin inlet and outlet will likely be needed, but the impact of the difference compared to the conceptual design should be negligible.                                                                           | Possible | Marginal           | 1   |
| FE-4      | 4 Road Crossing                    | Unusual parts, material or equipment manufactured or installed? |                                                                                                                                                    |                                                                                                                                                                                                                                                | Unlikely | Negligible         | 0   |
| FE-5      | 5 Grading                          | Unusual parts, material or equipment manufactured or installed? | Installation of the basin inlet and outlet.                                                                                                        | A more detailed design of the basin inlet and outlet will likely be needed, but the impact of the difference compared to the conceptual design should be negligible.                                                                           | Possible | Significant        | 2   |
| FE-6      | 6 Post-Construction<br>Monitoring  | Unusual parts, material or equipment manufactured or installed? | Any specialized fabrication could impact cost due to change of material costs, complex designs, sole source fabrications that are not competitive. | Not applicable.                                                                                                                                                                                                                                | Unlikely | Negligible         | 0   |
| FE-7      | 7 Drainage                         | Unusual parts, material or equipment manufactured or installed? | Installation of the culvert inlet and outlet. Fabrication of manholes.                                                                             | A more detailed design of the culvert inlet and outlet will likely be needed, but the impact of the difference compared to the conceptual design should be negligible and the addition of the drain manholes will have a more marginal impact. | Possible | Significant        | 2   |
| FE-8      | 8 Driveway                         | Unusual parts, material or equipment manufactured or installed? |                                                                                                                                                    |                                                                                                                                                                                                                                                | Unlikely | Negligible         | 0   |
| FE-9      | 9 Basin                            | Unusual parts, material or equipment manufactured or installed? |                                                                                                                                                    |                                                                                                                                                                                                                                                | Unlikely | Negligible         | 0   |
| FE-10     | 0                                  | Unusual parts, material or equipment manufactured or installed? |                                                                                                                                                    |                                                                                                                                                                                                                                                | Unlikely | Negligible         | 0   |
| FE-11     | 0                                  | Unusual parts, material or equipment manufactured or installed? |                                                                                                                                                    |                                                                                                                                                                                                                                                | Unlikely | Negligible         | 0   |
| FE-12     | Remaining Construction Items       | Unusual parts, material or equipment manufactured or installed? | None.                                                                                                                                              |                                                                                                                                                                                                                                                | Unlikely | Negligible         | 0   |
| FE-13     | Planning, Engineering, & Design    | Unusual parts, material or equipment manufactured or installed? | None.                                                                                                                                              |                                                                                                                                                                                                                                                | Unlikely | Negligible         | 0   |
|           | Construction Management            | Unusual parts, material or equipment manufactured or installed? | None.                                                                                                                                              |                                                                                                                                                                                                                                                | Unlikely | Negligible         | 0   |

| K LO | timate Assumptions                |                                       |                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                              | Max Pot  | tential Cost Growth |
|------|-----------------------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------------------|
| ı    | Mobilization - Demobilization     | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to establish costs and are relative to contractor markups and assignment, quantities, crevs and productivities, quotes and historical cost data. Cost is based on current pricing.          | Depending on when the construction takes place, prices could very greatly and is dependent on the economy. Major quantities were provided by the AE and the critical cost items were adjusted to reflect reasonable cost as if this was abld item. As further details are developed, the major line item costs will be refined which could significantly affect the cost.    | Possible | Significant         |
|      | 2 Chainlink Fence                 | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to<br>establish costs and are relative to contractor markups and assignment,<br>quantities, crews and productivities, quotes and historical cost data. Cost is<br>based on current pricing. | Depending on when the construction takes place, prices could vary greatly and is dependent on the economy. Major quantities were provided by the AE and the critical cost items were algusted local sat if this ware abid item. As further details are developed, the major line item costs will be refined which could significantly affect the cost.                       | Possible | Significant         |
|      | 3 Dewatering                      | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to<br>establish costs and are relative to contractor markups and assignment,<br>quantities, crews and productivities, quotes and historical cost data. Cost is<br>based on current pricing. | Depending on when the construction takes place, prices could vary greatly and is dependent on the economy. Major quantities were provided by the AE and the critical cost times were adjusted to reflect reasonable cost as if this were a bid item. As further details are developed, the major line item costs will be refined which could significantly affect the cost.  | Possible | Significant         |
|      | 4 Road Crossing                   | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to<br>establish costs and are relative to contractor markups and assignment,<br>quantities, crews and productivities, quotes and historical cost data. Cost is<br>based on current pricing. | Depending on when the construction takes place, prices could vary greatly and is dependent on the economy. Major quantities were provided by the AE and the critical cost items were adjusted to reflect reasonable cost as if this were a bid item. As further details are developed, the major line item costs will be infined which could significantly affect the cost.  | Possible | Significant         |
|      | 5 Grading                         | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to<br>establish costs and are relative to contractor markups and assignment,<br>quantities, crews and productivities, quotes and historical cost data. Cost is<br>based on current pricing. | Depending on when the construction takes place, prices could vary greatly and is dependent on the economy. Major quantities were provided by the AE and the critical cost items were adjusted to reflect reasonable cost as if this were a bid item. As further details are developed, the major line item costs will be refined which could significantly affect the cost.  | Possible | Significant         |
|      | 6 Post-Construction<br>Monitoring | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to<br>establish costs and are relative to contractor markups and assignment,<br>quantities, crews and productivities, quotes and historical cost data. Cost is<br>based on current pricing. | Depending on when the construction takes place, prices could visry greatly and is dependent on the economy. Major quantities were provided by the AE and the critical cost items were adjusted to reflect reasonable cost as if this were a bid item. As further details are developed, the major line item costs will be infined which could significantly affect the cost. | Possible | Marginal            |
|      | 7 Drainage                        | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to<br>establish costs and are relative to contractor markups and assignment,<br>quantities, crews and productivities, quotes and historical cost data. Cost is<br>based on current pricing. | Depending on when the construction takes place, prices could vary greatly and is dependent on the economy. Major quantities were provided by the AE and the critical cost times were adjusted to reflect reasonable cost as if this were a bid item. As further details are developed, the major line item costs will be refined which could significantly affect the cost.  | Possible | Significant         |
|      | 8 Driveway                        | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to<br>establish costs and are relative to contractor markups and assignment,<br>quantities, crews and productivities, quotes and historical cost data. Cost is<br>based on current pricing. | Depending on when the construction takes place, prices could vary greatly and is dependent on the economy. Major quantities were provided by the AE and the critical cost times were adjusted to reflect reasonable cost as if this were a bid item. As further details are developed, the major line item costs will be refined which could significantly affect the cost.  | Possible | Significant         |
|      | 9 Basin                           | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to<br>establish costs and are relative to contractor markups and assignment,<br>quantities, crews and productivities, quotes and historical cost data. Cost is<br>based on current pricing. | Depending on when the construction takes place, prices could vary greatly and is dependent on the economy. Major quantities were provided by the AE and the critical cost times were adjusted to reflect reasonable cost as if this were a bid item. As further details are developed, the major line item costs will be refined which could significantly affect the cost.  | Possible | Significant         |
|      | 0                                 | Reliability and number of key quotes? |                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                              | Unlikely | Negligible          |
|      | 0                                 | Reliability and number of key quotes? |                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                              | Unlikely | Negligible          |
|      | Remaining Construction            | Reliability and number of key quotes? | None.                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                              | Unlikely | Negligible          |
|      | Planning, Engineering, & Design   | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to<br>establish costs and are relative to contractor markups and assignment,<br>quantities, crews and productivities, quotes and historical cost data. Cost is<br>based on current pricing. |                                                                                                                                                                                                                                                                                                                                                                              | Possible | Significant         |
| ı    |                                   | Reliability and number of key quotes? | Assumptions based on concept design. Assumptions were used to establish costs and are relative to contractor markups and assignment, quantities, creves and productivities, quotes and historical cost data. Cost is                                   |                                                                                                                                                                                                                                                                                                                                                                              | Possible | Marginal            |

| external   | Project Risks                     |                                       |                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                     | Max Pote | ential Cost Growth | 40 |
|------------|-----------------------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------|----|
| X-1        | Mobilization -     Demobilization | Potential for severe adverse weather? | External risks such as failure to obtain permits in a timely manner, political risks, delays or cancellation of funding sources could impact project costs. Potential for adverse weather.                                                                                             | Depending on the project schedule, weather is likely to affect the project schedule. However, the construction of the basin would be part of the critical path so the impact would have a marginal effect.                                                                                                                                          | Possible | Marginal           | 1  |
| <b>(-2</b> | 2 Chainlink Fence                 | Potential for severe adverse weather? | External risks such as failure to obtain permits in a timely manner, political risks, delays or cancellation of funding sources could impact project costs. Potential for adverse weather.                                                                                             | Depending on the project schedule, weather is likely to affect the project schedule. However, the construction of the basin would be part of the critical path so the impact would have a marginal effect.                                                                                                                                          | Possible | Marginal           | 1  |
| (-3        | 3 Dewatering                      | Potential for severe adverse weather? | External risks such as failure to obtain permits in a timely manner, political risks, delays or cancellation of funding sources could impact project costs. Potential for adverse weather.                                                                                             | Depending on the project schedule, weather is likely to affect the project schedule. However, the construction of the basin would be part of the critical path so the impact would have a marginal effect.                                                                                                                                          | Possible | Significant        | 2  |
| -4         | 4 Road Crossing                   | Potential for severe adverse weather? | External risks such as failure to obtain permits in a timely manner, political<br>risks, delay or carcellation of funding sources could impact project costs.<br>Checked for which we wisher.<br>Potential for advanta weather.                                                        |                                                                                                                                                                                                                                                                                                                                                     | Possible | Marginal           | 1  |
| -5         | 5 Grading                         | Potential for severe adverse weather? | External risks such as failure to obtain permits in a timely manner, political  Depending on the project schedule, weather is likely to affect the project schedule. However, the construction of the basin would be part of the crit path so the impact would have a marginal effect. |                                                                                                                                                                                                                                                                                                                                                     | Possible | Significant        | 2  |
| -6         | 6 Post-Construction<br>Monitoring | Potential for severe adverse weather? | External risks such as failure to obtain permits in a timely manner, political risks, delays or cancellation of funding sources could impact project costs. Potential for adverse weather.                                                                                             | Depending on the project schedule, weather is likely to affect the project schedule. However, the construction of the basin would be part of the critical path so the impact would have a marginal effect.                                                                                                                                          | Possible | Negligible         | 0  |
| (-7        | 7 Drainage                        | Potential for severe adverse weather? | External risks such as failure to obtain permits in a timely manner, political risks, delays or cancellation of funding sources could impact project costs. Ability to establish easement agreements. Potential for adverse weather.                                                   | Depending on the project schedule, weather is likely to affect the project schedule. However, the construction of the basin would be part of the critical parts on the impact would have a marginal effect. The ability to establish easements which may be needed to convey the discharge to the lagoon may have a marginal effect on the project. | Possible | Significant        | 2  |
| (-8        | 8 Driveway                        | Potential for severe adverse weather? | External risks such as failure to obtain permits in a timely manner, political risks, delays or cancellation of funding sources could impact project costs. Ability to establish easement acreements. Potential for adverse weather.                                                   | Depending on the project schedule, weather is likely to affect the project schedule. However, the construction of the basin would be part of the critical path so the impract would have a marginal effect. The ability to establish easements which may be needed to convey the discharge to the lagoon may have a marginal effect on the project. | Possible | Significant        | 2  |
| -9         | 9 Basin                           | Potential for severe adverse weather? | External risks such as failure to obtain permits in a timely manner, political risks, delays or cancellation of funding sources could impact project costs. Ability to satablish element agreements. Potential to adverse wea                                                          | Depending on the project schedule, weather is likely to affect the project schedule. However, the construction of the basin would be part of the critical path so the impact would have a marginal effect. The ability to establish easements which may be needed to convey the discharge to the lagoon may have a marginal effect on the project.  | Possible | Significant        | 2  |
| -10        | 0                                 | Potential for severe adverse weather? |                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                     | Unlikely | Negligible         | 0  |
| -11        | 0                                 | Potential for severe adverse weather? |                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                     | Unlikely | Negligible         | O  |
| -12        | Remaining Construction            | Potential for severe adverse weather? | None.                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                     | Unlikely | Negligible         | O  |
| -13        | Planning, Engineering, & Design   | Potential for severe adverse weather? | External risks such as political, funding sources could impact project costs over time.                                                                                                                                                                                                | Changes to permitting and other requirements could result in added coordination and design efforts.                                                                                                                                                                                                                                                 | Possible | Significant        | 2  |
| -          |                                   | Potential for severe adverse weather? | Potential for adverse weather.                                                                                                                                                                                                                                                         | Severe weather could impact the grading of the site and impact the schedule.                                                                                                                                                                                                                                                                        | Possible | Significant        | 2  |

# Saipan Lagoon Ecosystem Restoration - Alt 4 (C2Q2A1) Feasibility (Alternatives) Abbreviated Risk Analysis

|                                       |                                                 |                              |              |                 |           |                     | Potential             | Risk Areas            | i       |   |   |                                |                                     |                            |
|---------------------------------------|-------------------------------------------------|------------------------------|--------------|-----------------|-----------|---------------------|-----------------------|-----------------------|---------|---|---|--------------------------------|-------------------------------------|----------------------------|
|                                       | <sup>1</sup> Mobilization .<br>Demobilization . | <sup>2</sup> Chainlink Fence | 3 Dematering | 4 Road Crossing | 5 Grading | 6 Post-Construction | <sup>7</sup> Drainage | <sup>8</sup> Driveway | 9 Basin | 0 | 0 | Remaining<br>Construction lear | Planning,<br>Engineering,<br>Design | Construction<br>Management |
| Project Scope Growth                  | 1                                               | 2                            | 2            | -               | 3         | -                   | 3                     | -                     | 3       | - | - | -                              | 2                                   | 2                          |
| Acquisition Strategy                  | -                                               | -                            | -            | -               | -         | -                   | -                     | -                     | -       | - | - | -                              | -                                   | -                          |
| Construction Elements                 | 2                                               | -                            | 2            | 1               | 2         | -                   | 2                     | 1                     | 2       | - | - | -                              | -                                   | -                          |
| Quantities for Current<br>Scope       | 2                                               | 2                            | 1            | -               | 3         | -                   | 2                     | -                     | 2       | - | - | -                              | -                                   | -                          |
| Specialty Fabrication or<br>Equipment | 1                                               | -                            | 1            | -               | 2         | -                   | 2                     | -                     | -       | - | - | -                              | -                                   | -                          |
| Cost Estimate<br>Assumptions          | 2                                               | 2                            | 2            | 2               | 2         | 1                   | 2                     | 2                     | 2       | - | - | -                              | 2                                   | 1                          |
| External Project Risks                | 1                                               | 1                            | 2            | 1               | 2         | -                   | 2                     | 2                     | 2       | - | - | -                              | 2                                   | 2                          |

**Typical Risk Elements** 

Appendix I CE/ICA Variable Calculations

#### Average Annual Runoff Reduction Calculations for Each Drainage Basin Design

|                        | Storage<br>Capacity | Runoff Reduction at Each Probablity (ac-ft) |        |        |        |        | Average Annual<br>Runoff<br>Reduction | Reduction  |
|------------------------|---------------------|---------------------------------------------|--------|--------|--------|--------|---------------------------------------|------------|
| Drainage Basin Design  | (ac-ft)             | 1                                           | 0.5    | 0.2    | 0.1    | 0.04   | (ac-ft)                               | Factor "Y" |
| China House 2-yr       | 4.765               | 0                                           | 4.765  | 4.765  | 4.765  | 4.765  | 3.38315                               | 0.532      |
| China House 5-yr       | 13.54               | 0                                           | 4.765  | 13.54  | 13.54  | 13.54  | 6.1034                                | 0.960      |
| China House 10-yr      | 15.839              | 0                                           | 4.765  | 13.54  | 15.839 | 15.839 | 6.35629                               | 1.000      |
| Quartermaster 2-yr     | 1.52                | 0                                           | 1.52   | 1.52   | 1.52   | 1.52   | 1.0792                                | 0.460      |
| Quartermaster 5-yr     | 4.885               | 0                                           | 1.52   | 4.885  | 4.885  | 4.885  | 2.12235                               | 0.905      |
| Quartermaster 10-yr    | 6.92                | 0                                           | 1.52   | 4.885  | 6.92   | 6.92   | 2.3462                                | 1.000      |
| Cock Fight Arena 2-yr  | 11.845              | 0                                           | 11.845 | 11.845 | 11.845 | 11.845 | 8.40995                               | 0.970      |
| Cock Fight Arena 5-yr  | 11.845              | 0                                           | 11.845 | 11.845 | 11.845 | 11.845 | 8.40995                               | 0.970      |
| Cock Fight Arena 10-yr | 14.23               | 0                                           | 11.845 | 11.845 | 14.23  | 14.23  | 8.6723                                | 1.000      |

#### **Sample Calculation for China House**

10-year

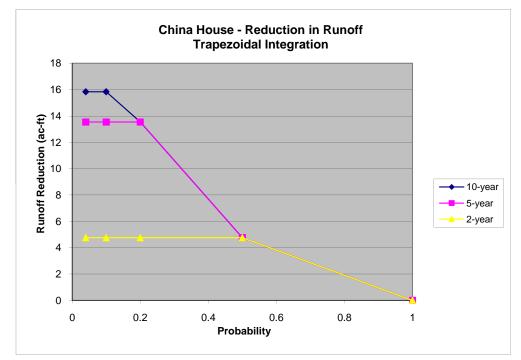
| 10-year |                                                    |           |                  |  |  |  |  |  |  |
|---------|----------------------------------------------------|-----------|------------------|--|--|--|--|--|--|
|         |                                                    | Runoff    | Average Annual   |  |  |  |  |  |  |
| Return  |                                                    | Reduction | Runoff Reduction |  |  |  |  |  |  |
| Period  | Probability                                        | (ac-ft)   | (ac-ft)          |  |  |  |  |  |  |
| 1       | 1                                                  | 0         | 0                |  |  |  |  |  |  |
| 2       | 0.5                                                | 4.765     | 1.191            |  |  |  |  |  |  |
| 5       | 0.2                                                | 13.540    | 2.746            |  |  |  |  |  |  |
| 10      | 0.1                                                | 15.839    | 1.469            |  |  |  |  |  |  |
| 25      | 0.04                                               | 15.839    | 0.950            |  |  |  |  |  |  |
| Averag  | Average Annual Reduction in Runoff (Total) = 6.356 |           |                  |  |  |  |  |  |  |

5-year

|        |                                                    | Runoff    | Average Annual   |  |  |  |  |  |  |
|--------|----------------------------------------------------|-----------|------------------|--|--|--|--|--|--|
| Return |                                                    | Reduction | Runoff Reduction |  |  |  |  |  |  |
| Period | Probability                                        | (ac-ft)   | (ac-ft)          |  |  |  |  |  |  |
| 1      | 1                                                  | 0         | 0                |  |  |  |  |  |  |
| 2      | 0.5                                                | 4.765     | 1.191            |  |  |  |  |  |  |
| 5      | 0.2                                                | 13.54     | 2.746            |  |  |  |  |  |  |
| 10     | 0.1                                                | 13.54     | 1.354            |  |  |  |  |  |  |
| 25     | 0.04                                               | 13.54     | 0.812            |  |  |  |  |  |  |
| Averag | Average Annual Reduction in Runoff (Total) = 6.103 |           |                  |  |  |  |  |  |  |

2-year

|        |                                                    | Runoff    | Average Annual   |  |  |  |  |  |
|--------|----------------------------------------------------|-----------|------------------|--|--|--|--|--|
| Return |                                                    | Reduction | Runoff Reduction |  |  |  |  |  |
| Period | Probability                                        | (ac-ft)   | (ac-ft)          |  |  |  |  |  |
| 1      | 1                                                  | 0         | 0                |  |  |  |  |  |
| 2      | 0.5                                                | 4.765     | 1.191            |  |  |  |  |  |
| 5      | 0.2                                                | 4.765     | 1.430            |  |  |  |  |  |
| 10     | 0.1                                                | 4.765     | 0.477            |  |  |  |  |  |
| 25     | 0.04                                               | 4.765     | 0.286            |  |  |  |  |  |
| Averag | Average Annual Reduction in Runoff (Total) = 3.383 |           |                  |  |  |  |  |  |



#### Notes

- 1. The total average annual reduction in runoff for each drinage basin design is the area under the curve. As can be easily seen from the graph, the effect of less frequent (<25-years) storms would be negligable.
- 2. The reduction factor "Y" is calculated as the proportion of average annual runoff reduction for each design level compared with the average annual runoff reduction from the 10-year design.

#### Lagoon Habitat Units (LGHUs) Restored by Reducing Freshwater Runoff (FW)

|                        |         |          | Total     |           | Total   |             |           |
|------------------------|---------|----------|-----------|-----------|---------|-------------|-----------|
|                        |         | Drainage | Watershed |           | Lagoon  | Linear      | Reduction |
|                        | FW      | Area     | Area      | % Total   | Area    | Application | Factor    |
| Drainage Basin Design  | (acres) | (acres)  | (acres)   | Watershed | (acres) | (acres)     | (Y)       |
| China House 2-yr       | 33.964  | 344      | 2000      | 17.20%    | 371     | 63.812      | 0.53225   |
| China House 5-yr       | 61.273  | 344      | 2000      | 17.20%    | 371     | 63.812      | 0.96021   |
| China House 10-yr      | 63.812  | 344      | 2000      | 17.20%    | 371     | 63.812      | 1.00000   |
| Quartermaster 2-yr     | 9.301   | 109      | 2000      | 5.45%     | 371     | 20.2195     | 0.45998   |
| Quartermaster 5-yr     | 18.290  | 109      | 2000      | 5.45%     | 371     | 20.2195     | 0.90459   |
| Quartermaster 10-yr    | 20.220  | 109      | 2000      | 5.45%     | 371     | 20.2195     | 1.00000   |
| Cock Fight Arena 2-yr  | 74.294  | 413      | 2000      | 20.65%    | 371     | 76.6115     | 0.96975   |
| Cock Fight Arena 5-yr  | 74.294  | 413      | 2000      | 20.65%    | 371     | 76.6115     | 0.96975   |
| Cock Fight Arena 10-yr | 76.612  | 413      | 2000      | 20.65%    | 371     | 76.6115     | 1.00000   |

Lagoon Habitat Units (LGHUs) Restored by Reducing Runoff from Runoff Potentially Contaminating Activities (PCAs) (R)

|                        |          |             |        |        | Total   |           |
|------------------------|----------|-------------|--------|--------|---------|-----------|
|                        |          | PCAs/       |        | Total  | Lagoon  | Reduction |
|                        | R        | Total       | Runoff | Runoff | Area    | Factor    |
| Drainage Basin Design  | (acres)  | PCAs*Y      | PCAs   | PCAs   | (acres) | (Y)       |
| China House 2-yr       | 60.75865 | 0.16376994  | 8      | 26     | 371     | 0.53225   |
| China House 5-yr       | 109.6121 | 0.295450527 | 8      | 26     | 371     | 5.65549   |
| China House 10-yr      | 114.1538 | 0.307692308 | 8      | 26     | 371     | 2.99493   |
| Quartermaster 2-yr     | 13.12706 | 0.035382911 | 2      | 26     | 371     | 0.45998   |
| Quartermaster 5-yr     | 25.81562 | 0.069583877 | 2      | 26     | 371     | 0.25236   |
| Quartermaster 10-yr    | 28.53846 | 0.076923077 | 2      | 26     | 371     | 0.27898   |
| Cock Fight Arena 2-yr  | 27.67513 | 0.074596039 | 2      | 26     | 371     | 0.96975   |
| Cock Fight Arena 5-yr  | 27.67513 | 0.074596039 | 2      | 26     | 371     | 0.96975   |
| Cock Fight Arena 10-yr | 28.53846 | 0.076923077 | 2      | 26     | 371     | 1.00000   |

Lagoon Habitat Units (LGHUs) Restored by Reducing Runoff from Hazardous Waste Potentially Contaminating Activities (PCAs) (H)

|                        |          |             |           | Total     | Total   |           |
|------------------------|----------|-------------|-----------|-----------|---------|-----------|
|                        |          | PCAs/       | Hazardous | Hazardous | Lagoon  | Reduction |
|                        | Н        | Total       | Waste     | Waste     | Area    | Factor    |
| Drainage Basin Design  | (acres)  | PCAs*Y      | PCAs      | PCAs      | (acres) | (Y)       |
| China House 2-yr       | 43.1956  | 0.116430192 | 7         | 32        | 371     | 0.53225   |
| China House 5-yr       | 77.92738 | 0.210046859 | 7         | 32        | 371     | 5.65549   |
| China House 10-yr      | 81.15625 | 0.21875     | 7         | 32        | 371     | 2.99493   |
| Quartermaster 2-yr     | 10.66574 | 0.028748615 | 2         | 32        | 371     | 0.45998   |
| Quartermaster 5-yr     | 20.97519 | 0.0565369   | 2         | 32        | 371     | 0.25236   |
| Quartermaster 10-yr    | 23.1875  | 0.0625      | 2         | 32        | 371     | 0.27898   |
| Cock Fight Arena 2-yr  | 44.97209 | 0.121218564 | 4         | 32        | 371     | 0.96975   |
| Cock Fight Arena 5-yr  | 44.97209 | 0.121218564 | 4         | 32        | 371     | 0.96975   |
| Cock Fight Arena 10-yr | 46.375   | 0.125       | 4         | 32        | 371     | 1.00000   |

#### Lagoon Habitat Units (LGHUs) Restored by Reducing Sedimentation (S)

|                        | -        |             |              |              |         |           |
|------------------------|----------|-------------|--------------|--------------|---------|-----------|
|                        |          |             | Unvegetated/ |              |         |           |
|                        |          | Acres       | Unpaved      | Unvegetated/ |         |           |
|                        |          | Drainage    | Land within  | Unpaved      | Total   |           |
|                        |          | Area/       | Drainage     | Land within  | Lagoon  | Reduction |
|                        | S        | Acres       | Area         | Project Area | Area    | Factor    |
| Drainage Basin Design  | (acres)  | Watershed*Y | (acres)      | (acres)      | (acres) | (Y)       |
| China House 2-yr       | 83.24925 | 0.224391501 | 20.7         | 49.1         | 371     | 0.53225   |
| China House 5-yr       | 150.1865 | 0.404815361 | 20.7         | 49.1         | 371     | 5.65549   |
| China House 10-yr      | 156.4094 | 0.421588595 | 20.7         | 49.1         | 371     | 2.99493   |
| Quartermaster 2-yr     | 24.32917 | 0.065577288 | 7            | 49.1         | 371     | 0.45998   |
| Quartermaster 5-yr     | 47.84565 | 0.128964008 | 7            | 49.1         | 371     | 0.25236   |
| Quartermaster 10-yr    | 52.89206 | 0.142566191 | 7            | 49.1         | 371     | 0.27898   |
| Cock Fight Arena 2-yr  | 110.6442 | 0.29823223  | 15.1         | 49.1         | 371     | 0.96975   |
| Cock Fight Arena 5-yr  | 110.6442 | 0.29823223  | 15.1         | 49.1         | 371     | 0.96975   |
| Cock Fight Arena 10-yr | 114.0957 | 0.307535642 | 15.1         | 49.1         | 371     | 1.00000   |

Appendix J IWR-PLAN Tables and Graphs

3/22/2013

11:34:07AM

All Plan Alternatives Planning Set: Saipan Lagoon REV03

| Counter | Name             | LGHU (Output)   | Cost      | Average |
|---------|------------------|-----------------|-----------|---------|
|         |                  | equivalent acre | \$1000    | Cost    |
| 1       | No Action Plan   | 0.00            | 0.00      | 101.00  |
| 2       | C0Q1A0           | 11.32           | 1,485.80  | 131.22  |
| 3       | C0Q2A0           | 22.27           | 2,118.00  | 95.11   |
| 4       | C0Q3A0           | 24.62           | 2,757.50  | 112.02  |
| 5       | C1Q0A0           | 42.49           | 2,164.90  | 50.95   |
| 6       | C1Q1A0           | 53.82           | 3,650.70  | 67.84   |
| 7       | C1Q2A0           | 64.76           | 4,282.90  | 66.13   |
| 8       | C1Q3A0           | 67.11           | 4,922.40  | 73.35   |
| 9       | C0Q0A1           | 70.33           | 2,747.80  | 39.07   |
| 10      | C0Q0A2           | 70.33           | 5,231.50  | 74.38   |
| 11      | C0Q0A3           | 72.53           | 5,686.30  | 78.40   |
| 12      | C2Q0A0           | 76.66           | 3,376.00  | 44.04   |
| 13      | C3Q0A0           | 79.84           | 4,810.80  | 60.26   |
| 14      | C0Q1A2           | 81.66           | 6,717.30  | 82.26   |
| 15      | C0Q1A1           | 81.66           | 4,233.60  | 51.85   |
| 16      | C0Q1A3           | 83.85           | 7,172.10  | 85.53   |
| 17      | C2Q1A0           | 87.99           | 4,861.80  | 55.26   |
| 18      | C3Q1A0           | 91.16           | 6,296.60  | 69.07   |
| 19      | C0Q2A1           | 92.60           | 4,865.80  | 52.55   |
| 20      | C0Q2A2           | 92.60           | 7,349.50  | 79.37   |
| 21      | C0Q2A3           | 94.80           | 7,804.30  | 82.33   |
| 22      | C0Q3A2           | 94.95           | 7,989.00  | 84.14   |
| 23      | C0Q3A1           | 94.95           | 5,505.30  | 57.98   |
| 24      | C0Q3A3           | 97.15           | 8,443.80  | 86.92   |
| 25      | C2Q2A0           | 98.93           | 5,494.00  | 55.53   |
| 26      | C2Q3A0           | 101.28          | 6,133.50  | 60.56   |
| 27      | C3Q2A0           | 102.11          | 6,928.80  | 67.86   |
| 28      | C3Q3A0           | 104.46          | 7,568.30  | 72.46   |
| 29      | C1Q0A2           | 112.83          | 7,396.40  | 65.56   |
| 30      | C1Q0A1           | 112.83          | 4,912.70  | 43.54   |
| 31      | C1Q0A3           | 115.02          | 7,851.20  | 68.26   |
| 32      | ClQlAl           | 124.15          | 6,398.50  | 51.54   |
| 33      | C1Q1A2           | 124.15          | 8,882.20  | 71.55   |
| 34      | C1Q1A3           | 126.35          | 9,337.00  | 73.90   |
| 35      | C1Q1A0           | 135.09          | 7,030.70  | 52.04   |
| 36      | C1Q2A1<br>C1Q2A2 | 135.09          | 9,514.40  | 70.43   |
| 37      | C1Q2A2<br>C1Q2A3 | 137.29          | 9,969.20  | 72.61   |
| 38      | C1Q2A3<br>C1Q3A1 | 137.44          | 7,670.20  | 55.81   |
| 39      | C1Q3A1<br>C1Q3A2 | 137.44          | 10,153.90 | 73.88   |
|         |                  | 139.64          | 10,608.70 | 75.97   |
| 40      | C1Q3A3           | 146.99          | 6,123.80  | 41.66   |
| 41      | C2Q0A1           |                 |           |         |
| 42      | C2Q0A2           | 146.99          | 8,607.50  | 58.56   |
| 43      | C2Q0A3           | 149.19          | 9,062.30  | 60.74   |
| 44      | C3Q0A2           | 150.17          | 10,042.30 | 66.87   |
| 45      | C3Q0A1           | 150.17          | 7,558.60  | 50.33   |
| 46      | C3Q0A3           | 152.37          | 10,497.10 | 68.89   |
| 47      | C2Q1A1           | 158.32          | 7,609.60  | 48.07   |
| 48      | C2Q1A2           | 158.32          | 10,093.30 | 63.75   |
| 49      | C2Q1A3           | 160.51          | 10,548.10 | 65.71   |
| 50      | C3Q1A2           | 161.49          | 11,528.10 | 71.38   |
| 51      | C3Q1A1           | 161.49          | 9,044.40  | 56.00   |
| 52      | C3Q1A3           | 163.69          | 11,982.90 | 73.20   |
| 53      | C2Q2A2           | 169.26          | 10,725.50 | 63.37   |
| 54      | C2Q2A1           | 169.26          | 8,241.80  | 48.69   |
| 55      | C2Q2A3           | 171.46          | 11,180.30 | 65.21   |

**Total and Average Cost** 

11:34:07AM

3/22/2013

**All Plan Alternatives** 

Planning Set: Saipan Lagoon REV03

| Counter | Name   | LGHU (Output) equivalent acre | Cost<br>\$1000 | Average<br>Cost |
|---------|--------|-------------------------------|----------------|-----------------|
| 56      | C2Q3A1 | 171.61                        | 8,881.30       | 51.75           |
| 57      | C2Q3A2 | 171.61                        | 11,365.00      | 66.23           |
| 58      | C3Q2A2 | 172.44                        | 12,160.30      | 70.52           |
| 59      | C3Q2A1 | 172.44                        | 9,676.60       | 56.12           |
| 60      | C2Q3A3 | 173.81                        | 11,819.80      | 68.01           |
| 61      | C3Q2A3 | 174.64                        | 12,615.10      | 72.24           |
| 62      | C3Q3A2 | 174.79                        | 12,799.80      | 73.23           |
| 63      | C3Q3A1 | 174.79                        | 10,316.10      | 59.02           |
| 64      | C3Q3A3 | 176.98                        | 13,254.60      | 74.89           |

IWR-PLAN \* Plan Of Interest Page 2 of 2

### **Multiple Variable Report**

**Cost Effective Plan Alternatives** 

Planning Set: Saipan Lagoon REV03

3/22/2013

11:35:44AM

| Counter | Name           | Cost | FW       | H      | LGHU   | R      | S      |        |
|---------|----------------|------|----------|--------|--------|--------|--------|--------|
| 1       | No Action Plan |      | 0.00     | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   |
| 2       | COQ1A0         |      | 1485.80  | 9.30   | 10.67  | 11.32  | 13.13  | 24.33  |
| 3       | COQ2A0         |      | 2118.00  | 18.29  | 20.98  | 22.27  | 25.82  | 47.85  |
| 4       | C1Q0A0         |      | 2164.90  | 33.96  | 43.20  | 42.49  | 60.76  | 83.25  |
| 5       | COQOA1         |      | 2747.80  | 74.29  | 44.97  | 70.33  | 27.68  | 110.64 |
| 6       | C2Q0A0         |      | 3376.00  | 61.27  | 77.93  | 76.66  | 109.61 | 150.19 |
| 7       | COQ1A1         |      | 4233.60  | 83.59  | 55.64  | 81.66  | 40.81  | 134.97 |
| 8       | C2Q1A0         |      | 4861.80  | 70.57  | 88.60  | 87.99  | 122.74 | 174.52 |
| 9       | COQ2A1         |      | 4865.80  | 92.58  | 65.95  | 92.60  | 53.50  | 158.49 |
| 10      | C1Q0A1         |      | 4912.70  | 108.25 | 88.17  | 112.83 | 88.44  | 193.89 |
| 11      | C2Q0A1         |      | 6123.80  | 135.56 | 122.90 | 146.99 | 137.29 | 260.83 |
| 12      | C3Q0A1         |      | 7558.60  | 138.10 | 126.13 | 150.17 | 141.83 | 267.05 |
| 13      | C2Q1A1         |      | 7609.60  | 144.86 | 133.57 | 158.32 | 150.42 | 285.16 |
| 14      | C2Q2A1         |      | 8241.80  | 153.85 | 143.88 | 169.26 | 163.11 | 308.68 |
| 15      | C2Q3A1         |      | 8881.30  | 155.78 | 146.09 | 171.61 | 165.83 | 313.72 |
| 16      | C3Q2A1         |      | 9676.60  | 156.39 | 147.11 | 172.44 | 167.65 | 314.90 |
| 17      | C3Q3A1         |      | 10316.10 | 158.32 | 149.32 | 174.79 | 170.37 | 319.94 |
| 18      | C3Q3A3         |      | 13254.60 | 160.64 | 150.73 | 176.98 | 171.23 | 323.40 |

## **Incremental Cost of Best Buy Plan Combinations (Ordered By Output)**

Planning Set: Saipan Lagoon REV03

3/22/2013

11:36:25AM

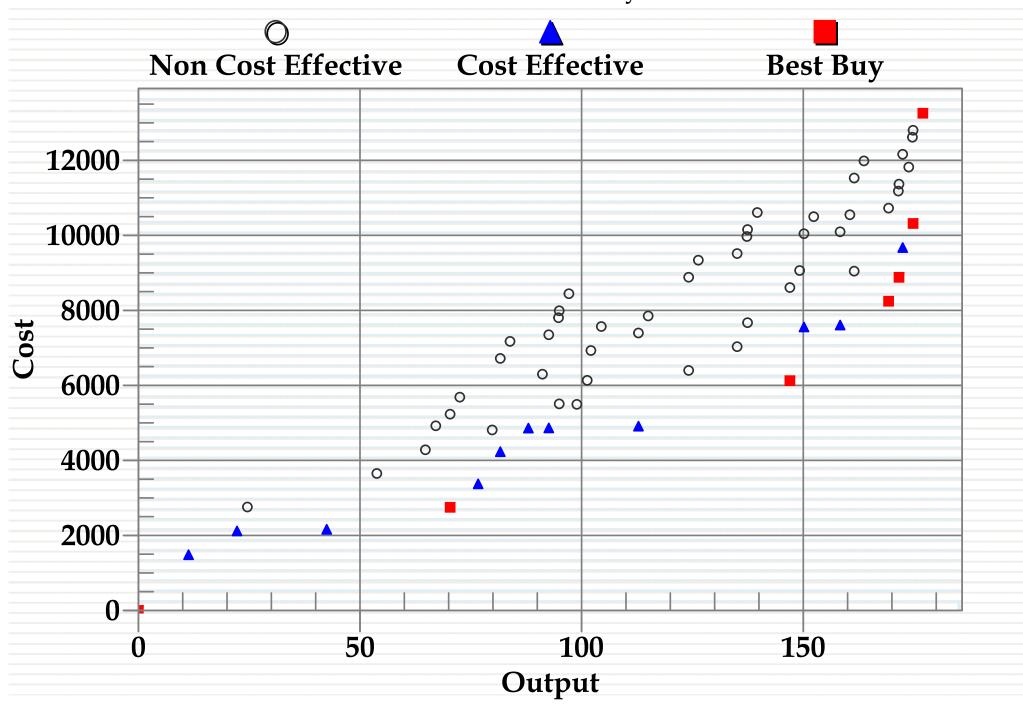
| _                        |                                    |                  |                                                |                            |                                  |                         |
|--------------------------|------------------------------------|------------------|------------------------------------------------|----------------------------|----------------------------------|-------------------------|
| Counter Plan Alternative | LGHU (Output)<br>(equivalent acre) | Cost<br>(\$1000) | Average Cost Inc<br>(\$1000 / equivalent acre) | eremental Cost<br>(\$1000) | Inc. Output<br>(equivalent acre) | Inc. Cost<br>Per Output |
| l No Action Plan         | 0.00                               | 0.0              | )                                              |                            |                                  |                         |
| 2 C0Q0A1                 | 70.33                              | 2,747.80         | 39.0690                                        | 2,747.800                  | 0 70.3320                        | 39.0690                 |
| 3 C2Q0A1                 | 146.99                             | 6,123.80         | 41.6602                                        | 3,376.000                  | 0 76.6620                        | 44.0375                 |
| 4 C2Q2A1                 | 169.26                             | 8,241.80         | 48.6926                                        | 2,118.000                  | 0 22.2680                        | 95.1141                 |
| 5 C2Q3A1                 | 171.61                             | 8,881.30         | 51.7528                                        | 639.500                    | 0 2.3480                         | 272.3595                |
| 6 C3Q3A1                 | 174.79                             | 10,316.1         | 59.0210                                        | 1,434.800                  | 0 3.1770                         | 451.6210                |
| 7 C3O3A3                 | 176.98                             | 13,254.60        | 74.8915                                        | 2,938.500                  | 0 2.1970                         | 1,337.5057              |

IWR-PLAN
Page 1 of 1

# Planning Set "Saipan Lagoon REV03" Cost and Output All Plan Alternatives Cost 0-Output

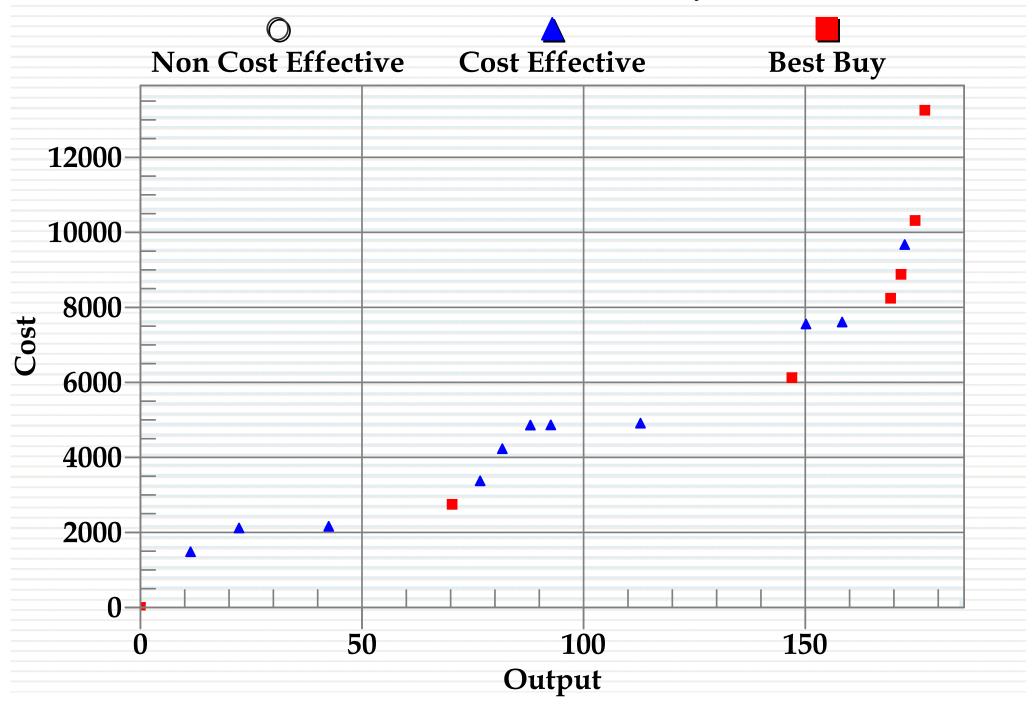
## Planning Set "Saipan Lagoon REV03" Cost and Output

All Plan Alternatives Differentiated by Cost Effectiveness



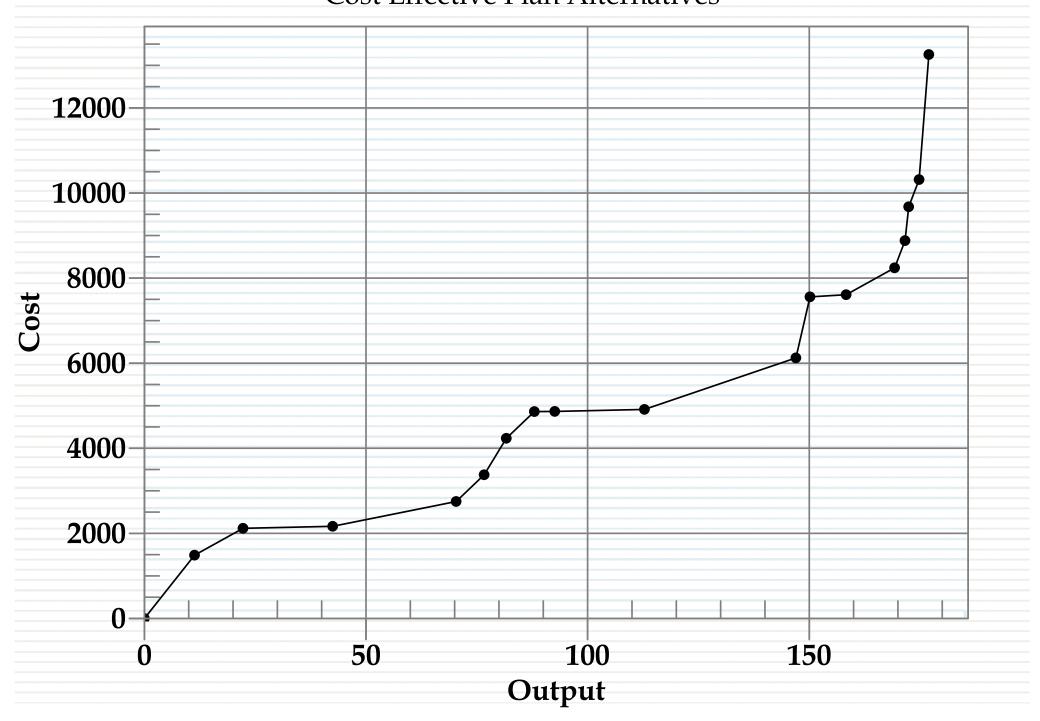
## Planning Set "Saipan Lagoon REV03" Cost and Output

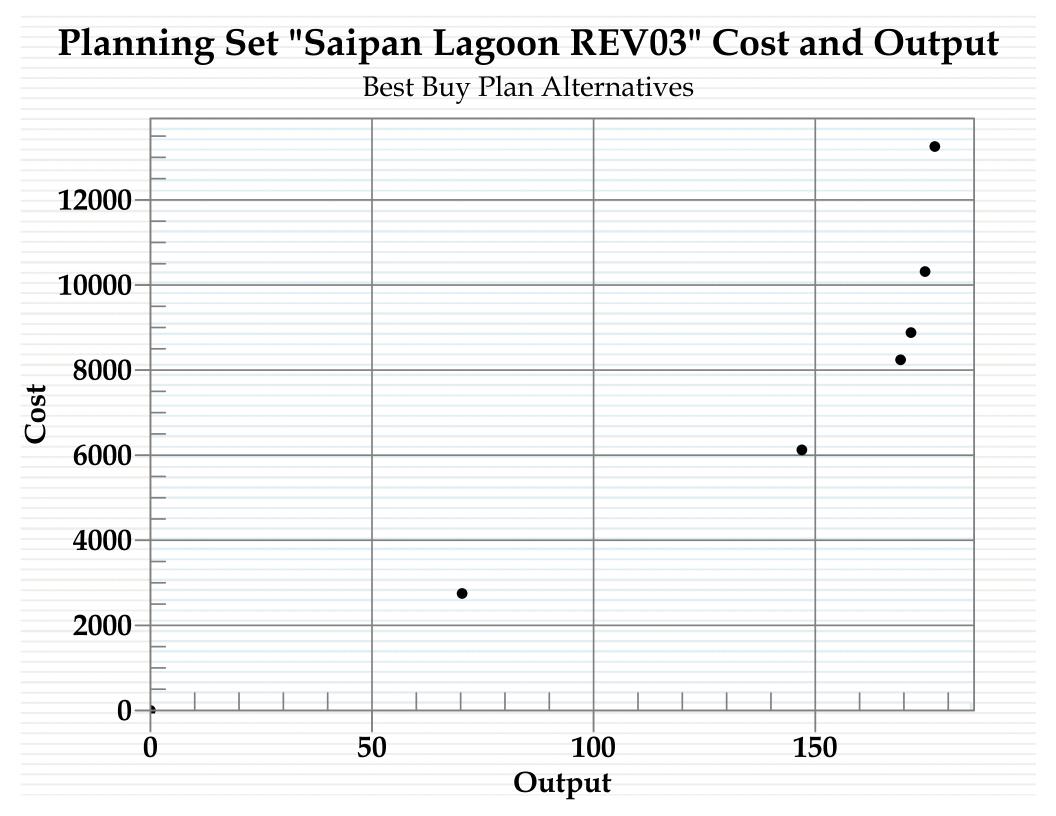
Cost Effective Plan Alternatives Differentiated by Cost Effectiveness

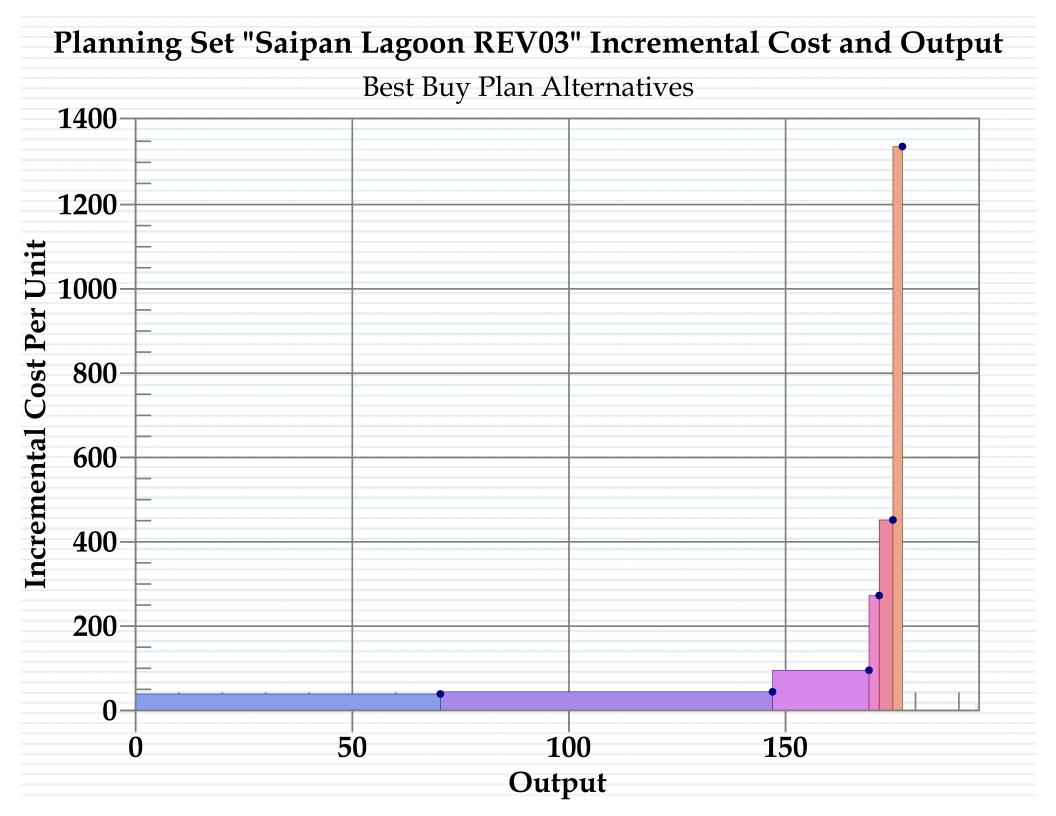


## Planning Set "Saipan Lagoon REV03" Cost and Output

Cost Effective Plan Alternatives







**Initial terms:** 

Discount rate %: 3.75 Period of analysis: 50 Capital recovery factor: 0.044574218 Avg annual cost: \$300,375.15

**Total initial cost:** 

Construction \$1,959,420.0 + Real Estate \$1,012,000.0 + Monitoring \$796,620.00 + Other \$518,440.00 = \$4,286,480.00

**Total Investment cost:** 

Total Initial Cost \$4,286,480.00 + PED \$2,193,370.00 + IDC \$133,281.00 = \$6,613,131.00

Initial investment:

Total Investment Cost \$6,613,131.0 PV Factor 1.000000 Present Value = \$6,613,131.00

| Year   | Cost                     | PV Factor | Present Value            |
|--------|--------------------------|-----------|--------------------------|
| 0      | \$6,613,131.00           | 1.0000    | \$6,613,131.00           |
| 1      | \$5,600.00               | 0.9639    | \$5,397.59               |
| 2      | \$5,600.00               | 0.9290    | \$5,202.50               |
| 2<br>3 | \$5,600.00               | 0.8954    | \$5,014.45               |
| 4      | \$5,600.00               | 0.8631    | \$4,833.21               |
| 5      | \$5,600.00               | 0.8319    | \$4,658.52               |
| 6      | \$5,600.00               | 0.8018    | \$4,490.13               |
| 6<br>7 | \$5,600.00               | 0.7728    | \$4,327.84               |
| 8      | \$5,600.00               | 0.7449    | \$4,171.41               |
| 9      | \$5,600.00               | 0.7180    | \$4,020.64               |
| 10     | \$5,600.00               | 0.6920    | \$3,875.31               |
| 11     | \$5,600.00               | 0.6670    | \$3,735.24               |
| 12     | \$5,600.00               | 0.6429    | \$3,600.23               |
| 13     | \$5,600.00<br>\$5,600.00 | 0.6197    | \$3,470.11               |
|        |                          |           |                          |
| 14     | \$5,600.00<br>\$5,600.00 | 0.5973    | \$3,344.68<br>\$3,222.70 |
| 15     | \$5,600.00               | 0.5757    | \$3,223.79               |
| 16     | \$5,600.00               | 0.5549    | \$3,107.27               |
| 17     | \$5,600.00               | 0.5348    | \$2,994.95               |
| 18     | \$5,600.00               | 0.5155    | \$2,886.70               |
| 19     | \$5,600.00               | 0.4969    | \$2,782.36               |
| 20     | \$5,600.00               | 0.4789    | \$2,681.80               |
| 21     | \$5,600.00               | 0.4616    | \$2,584.86               |
| 22     | \$5,600.00               | 0.4449    | \$2,491.44               |
| 23     | \$5,600.00               | 0.4288    | \$2,401.38               |
| 24     | \$5,600.00               | 0.4133    | \$2,314.59               |
| 25     | \$5,600.00               | 0.3984    | \$2,230.93               |
| 26     | \$5,600.00               | 0.3840    | \$2,150.29               |
| 27     | \$5,600.00               | 0.3701    | \$2,072.57               |
| 28     | \$5,600.00               | 0.3567    | \$1,997.66               |
| 29     | \$5,600.00               | 0.3438    | \$1,925.45               |
| 30     | \$5,600.00               | 0.3314    | \$1,855.86               |
| 31     | \$5,600.00               | 0.3194    | \$1,788.78               |
| 32     | \$5,600.00               | 0.3079    | \$1,724.12               |
| 33     | \$5,600.00               | 0.2968    | \$1,661.81               |
| 34     | \$5,600.00               | 0.2860    | \$1,601.74               |
| 35     | \$5,600.00               | 0.2757    | \$1,543.85               |
| 36     | \$5,600.00<br>\$5,600.00 | 0.2657    | \$1,488.05               |
| 37     | \$5,600.00<br>\$5,600.00 | 0.2561    | \$1,434.26               |
|        |                          |           |                          |
| 38     | \$5,600.00<br>\$5,600.00 | 0.2469    | \$1,382.42<br>\$4,333.45 |
| 39     | \$5,600.00               | 0.2379    | \$1,332.45               |
| 40     | \$5,600.00               | 0.2293    | \$1,284.29               |
| 41     | \$5,600.00               | 0.2210    | \$1,237.87               |
| 42     | \$5,600.00               | 0.2131    | \$1,193.13               |
| 43     | \$5,600.00               | 0.2054    | \$1,150.00               |
| 44     | \$5,600.00               | 0.1979    | \$1,108.44               |
| 45     | \$5,600.00               | 0.1908    | \$1,068.37               |
| 46     | \$5,600.00               | 0.1839    | \$1,029.76               |
| 47     | \$5,600.00               | 0.1772    | \$992.54                 |
| 48     | \$5,600.00               | 0.1708    | \$956.66                 |
| 49     | \$5,600.00               | 0.1647    | \$922.08                 |
| 50     | \$5,600.00               | 0.1587    | \$888.76                 |

Net Totals: Cost: \$6,893,131.00 Present Value: \$6,738,764.16 Avg Annual Cost: \$300,375.15

IWR-PLAN Page 1 of 1

**Initial terms:** 

Discount rate %: 3.75 Period of analysis: 50 Capital recovery factor: 0.044574218 Avg annual cost: \$458,532.13

**Total initial cost:** 

Construction \$5,576,550.0 + Real Estate \$1,600,980.0 + Monitoring \$1,621,860.0 + Other \$707,040.00 = \$9,506,430.00

**Total Investment cost:** 

Total Initial Cost \$9,506,430.00 + PED \$239,252.00 + IDC \$321,396.00 = \$10,067,078.00

Initial investment:

Total Investment Cost \$10,067,078. PV Factor 1.000000 Present Value = \$10,067,078.00

| Year   | Cost            | PV Factor | Present Value            |
|--------|-----------------|-----------|--------------------------|
| 0      | \$10,067,078.00 | 1.0000    | \$10,067,078.00          |
| 1      | \$9,800.00      | 0.9639    | \$9,445.78               |
| 2<br>3 | \$9,800.00      | 0.9290    | \$9,104.37               |
| 3      | \$9,800.00      | 0.8954    | \$8,775.30               |
| 4      | \$9,800.00      | 0.8631    | \$8,458.12               |
| 5      | \$9,800.00      | 0.8319    | \$8,152.40               |
| 6      | \$9,800.00      | 0.8018    | \$7,857.74               |
| 6<br>7 | \$9,800.00      | 0.7728    | \$7,573.72               |
| 8      | \$9,800.00      | 0.7449    | \$7,299.97               |
| 9      | \$9,800.00      | 0.7180    | \$7,036.12               |
| 10     | \$9,800.00      | 0.6920    | \$6,781.80               |
| 11     | \$9,800.00      | 0.6670    | \$6,536.68               |
|        |                 |           |                          |
| 12     | \$9,800.00      | 0.6429    | \$6,300.41               |
| 13     | \$9,800.00      | 0.6197    | \$6,072.68               |
| 14     | \$9,800.00      | 0.5973    | \$5,853.19               |
| 15     | \$9,800.00      | 0.5757    | \$5,641.63               |
| 16     | \$9,800.00      | 0.5549    | \$5,437.71               |
| 17     | \$9,800.00      | 0.5348    | \$5,241.17               |
| 18     | \$9,800.00      | 0.5155    | \$5,051.73               |
| 19     | \$9,800.00      | 0.4969    | \$4,869.14               |
| 20     | \$9,800.00      | 0.4789    | \$4,693.14               |
| 21     | \$9,800.00      | 0.4616    | \$4,523.51               |
| 22     | \$9,800.00      | 0.4449    | \$4,360.01               |
| 23     | \$9,800.00      | 0.4288    | \$4,202.42               |
| 24     | \$9,800.00      | 0.4133    | \$4,050.53               |
| 25     | \$9,800.00      | 0.3984    | \$3,904.12               |
| 26     | \$9,800.00      | 0.3840    | \$3,763.01               |
| 27     | \$9,800.00      | 0.3701    | \$3,627.00               |
| 28     | \$9,800.00      | 0.3567    | \$3,495.90               |
| 29     | \$9,800.00      | 0.3438    | \$3,369.54               |
| 30     |                 | 0.3314    |                          |
|        | \$9,800.00      |           | \$3,247.75               |
| 31     | \$9,800.00      | 0.3194    | \$3,130.36               |
| 32     | \$9,800.00      | 0.3079    | \$3,017.22               |
| 33     | \$9,800.00      | 0.2968    | \$2,908.16               |
| 34     | \$9,800.00      | 0.2860    | \$2,803.05               |
| 35     | \$9,800.00      | 0.2757    | \$2,701.73               |
| 36     | \$9,800.00      | 0.2657    | \$2,604.08               |
| 37     | \$9,800.00      | 0.2561    | \$2,509.96               |
| 38     | \$9,800.00      | 0.2469    | \$2,419.24               |
| 39     | \$9,800.00      | 0.2379    | \$2,331.79               |
| 40     | \$9,800.00      | 0.2293    | \$2,247.51               |
| 41     | \$9,800.00      | 0.2210    | \$2,166.28               |
| 42     | \$9,800.00      | 0.2131    | \$2,087.98               |
| 43     | \$9,800.00      | 0.2054    | \$2,012.51               |
| 44     | \$9,800.00      | 0.1979    | \$1,939.77               |
| 45     | \$9,800.00      | 0.1908    | \$1,869.65               |
| 46     | \$9,800.00      | 0.1908    | \$1,802.08               |
|        |                 |           |                          |
| 47     | \$9,800.00      | 0.1772    | \$1,736.94<br>\$4,674.46 |
| 48     | \$9,800.00      | 0.1708    | \$1,674.16               |
| 49     | \$9,800.00      | 0.1647    | \$1,613.65               |
| 50     | \$9,800.00      | 0.1587    | \$1,555.32               |

IWR-PLAN Page 1 of 1

# Annualized Cost for "C2 Q2 A1"

**Initial terms:** 

Discount rate %: 3.75 Period of analysis: 50 Capital recovery factor: 0.044574218 Avg annual cost: \$723,888.53

**Total initial cost:** 

Construction \$7,507,920.0 + Real Estate \$2,180,150.0 + Monitoring \$2,416,130.0 + Other \$821,310.00 = \$12,925,510.00

**Total Investment cost:** 

Total Initial Cost \$12,925,510.00 + PED \$2,496,700.00 + IDC \$541,918.00 = \$15,964,128.00

Initial investment:

Total Investment Cost \$15,964,128. PV Factor 1.000000 Present Value = \$15,964,128.00

| Year        |                                                      | PV Factor | Present Value                 |
|-------------|------------------------------------------------------|-----------|-------------------------------|
| 0           | \$15,964,128.00                                      | 1.0000    | \$15,964,128.00               |
| 1           | \$12,300.00                                          | 0.9639    | \$11,855.42                   |
| 2           | \$12,300.00                                          | 0.9290    | \$11,426.91                   |
| 3           | \$12,300.00                                          | 0.8954    | \$11,013.89                   |
| 4           | \$12,300.00                                          | 0.8631    | \$10,615.80                   |
| 4<br>5      | \$12,300.00                                          | 0.8319    | \$10,232.10                   |
| 6           | \$12,300.00                                          | 0.8018    | \$9,862.26                    |
| 7           | \$12,300.00                                          | 0.7728    | \$9,505.79                    |
| 8           | \$12,300.00                                          | 0.7449    | \$9,162.21                    |
| 9           | \$12,300.00                                          | 0.7443    | \$8,831.05                    |
| 10          |                                                      | 0.6920    | \$8,511.85                    |
|             | \$12,300.00<br>\$42,300.00                           |           |                               |
| 11          | \$12,300.00                                          | 0.6670    | \$8,204.19                    |
| 12          | \$12,300.00                                          | 0.6429    | \$7,907.66                    |
| 13          | \$12,300.00                                          | 0.6197    | \$7,621.84                    |
| 14          | \$12,300.00                                          | 0.5973    | \$7,346.35                    |
| 15          | \$12,300.00                                          | 0.5757    | \$7,080.82                    |
| 16          | \$12,300.00                                          | 0.5549    | \$6,824.89                    |
| 17          | \$12,300.00                                          | 0.5348    | \$6,578.20                    |
| 18          | \$12,300.00                                          | 0.5155    | \$6,340.44                    |
| 19          | \$12,300.00                                          | 0.4969    | \$6,111.26                    |
| 20          | \$12,300.00                                          | 0.4789    | \$5,890.38                    |
| 21          | \$12,300.00                                          | 0.4616    | \$5,677.47                    |
| 22          | \$12,300.00                                          | 0.4449    | \$5,472.26                    |
| 23          | \$12,300.00                                          | 0.4288    | \$5,274.47                    |
| 23<br>24    |                                                      | 0.4266    |                               |
|             | \$12,300.00<br>\$12,300.00                           |           | \$5,083.82<br>\$4,000.07      |
| 25          | \$12,300.00                                          | 0.3984    | \$4,900.07                    |
| 26          | \$12,300.00                                          | 0.3840    | \$4,722.96                    |
| 27          | \$12,300.00                                          | 0.3701    | \$4,552.25                    |
| 28          | \$12,300.00                                          | 0.3567    | \$4,387.71                    |
| 29          | \$12,300.00                                          | 0.3438    | \$4,229.12                    |
| 30          | \$12,300.00                                          | 0.3314    | \$4,076.26                    |
| 31          | \$12,300.00                                          | 0.3194    | \$3,928.93                    |
| 32          | \$12,300.00                                          | 0.3079    | \$3,786.92                    |
| 33          | \$12,300.00                                          | 0.2968    | \$3,650.04                    |
| 34          | \$12,300.00                                          | 0.2860    | \$3,518.11                    |
| 35          | \$12,300.00                                          | 0.2757    | \$3,390.95                    |
| 36          | \$12,300.00                                          | 0.2657    | \$3,268.39                    |
| 37          | \$12,300.00                                          | 0.2561    | \$3,150.25                    |
| 38          | \$12,300.00                                          | 0.2469    | \$3,036.39                    |
| 39          | \$12,300.00                                          | 0.2379    | \$2,926.64                    |
| 40          | \$12,300.00                                          | 0.2293    | \$2,820.86                    |
| 41          | \$12,300.00                                          | 0.2210    | \$2,718.90                    |
| 42          | \$12,300.00                                          | 0.2210    | \$2,620.62                    |
|             |                                                      |           |                               |
| 43          | \$12,300.00<br>\$13,300.00                           | 0.2054    | \$2,525.90<br>\$3,434.60      |
| 44<br>45    | \$12,300.00<br>\$13,300.00                           | 0.1979    | \$2,434.60<br>\$3,346.61      |
| 45          | \$12,300.00                                          | 0.1908    | \$2,346.61                    |
| 46          | \$12,300.00                                          | 0.1839    | \$2,261.79                    |
| 47          | \$12,300.00                                          | 0.1772    | \$2,180.04                    |
| 48          | \$12,300.00                                          | 0.1708    | \$2,101.24                    |
| 49          | \$12,300.00                                          | 0.1647    | \$2,025.29                    |
| 50          | \$12,300.00                                          | 0.1587    | \$1,952.09                    |
| Net Totals: | Cost: \$16.579.128.00 Present Value: \$16.240.072.23 |           | Avg Annual Cost: \$723.888.53 |

Net Totals: Cost: \$16,579,128.00 Present Value: \$16,240,072.27 Avg Annual Cost: \$723,888.53

**Initial Terms** 

Max Output:70.33 unitsCalculation Method: Linear InterpolationPeriod of Analysis:50 yearsAverage Annual Output = 4.2198

| s: 50 years | Average Annual Output = 4.2198 |  |
|-------------|--------------------------------|--|
| Year        | Output Units                   |  |
| 0           | 0.00                           |  |
| 1           | 14.07                          |  |
| 2           | 28.13                          |  |
| 3           | 42.20                          |  |
| 4           | 56.26                          |  |
| 5           | 70.33                          |  |
| 6           | 0.00                           |  |
| 7           | 0.00                           |  |
| 8           | 0.00                           |  |
| 9           | 0.00                           |  |
| 10          | 0.00                           |  |
| 11          | 0.00                           |  |
| 12          | 0.00                           |  |
| 13          | <u> </u>                       |  |
| 14          | 0.00                           |  |
| 15          | 0.00                           |  |
| 16          | 0.00                           |  |
| 17          | 0.00                           |  |
| 18          | <u>0.</u> 00                   |  |
|             | 0.00                           |  |
|             | 0.00                           |  |
|             | 0.00                           |  |
|             | 0.00                           |  |
| 23          | 0.00                           |  |
| 24          | 0.00                           |  |
| 25          | 0.00                           |  |
| 26          | 0.00                           |  |
| 27          | 0.00                           |  |
|             | 0.00                           |  |
| 29          | 0.00                           |  |
|             | 0.00                           |  |
| 31<br>32    | 0.00<br>0.00                   |  |
| 33          | 0.00                           |  |
| 34          | 0.00                           |  |
| 35          | 0.00                           |  |
| 36          | 0.00                           |  |
| 37          | 0.00                           |  |
| 38          | 0.00                           |  |
| 39          | 0.00                           |  |
| 10          | 0.00                           |  |
| 11          | 0.00                           |  |
| 40          | 0.00                           |  |
| 43          | 0.00                           |  |
| 44          | 0.00                           |  |
| 45          | 0.00                           |  |
| 46          | 0.00                           |  |
| 47          | 0.00                           |  |
| 48          | 0.00                           |  |
| 49          | 0.00                           |  |
| 50          | 0.00                           |  |
|             |                                |  |

**Initial Terms** 

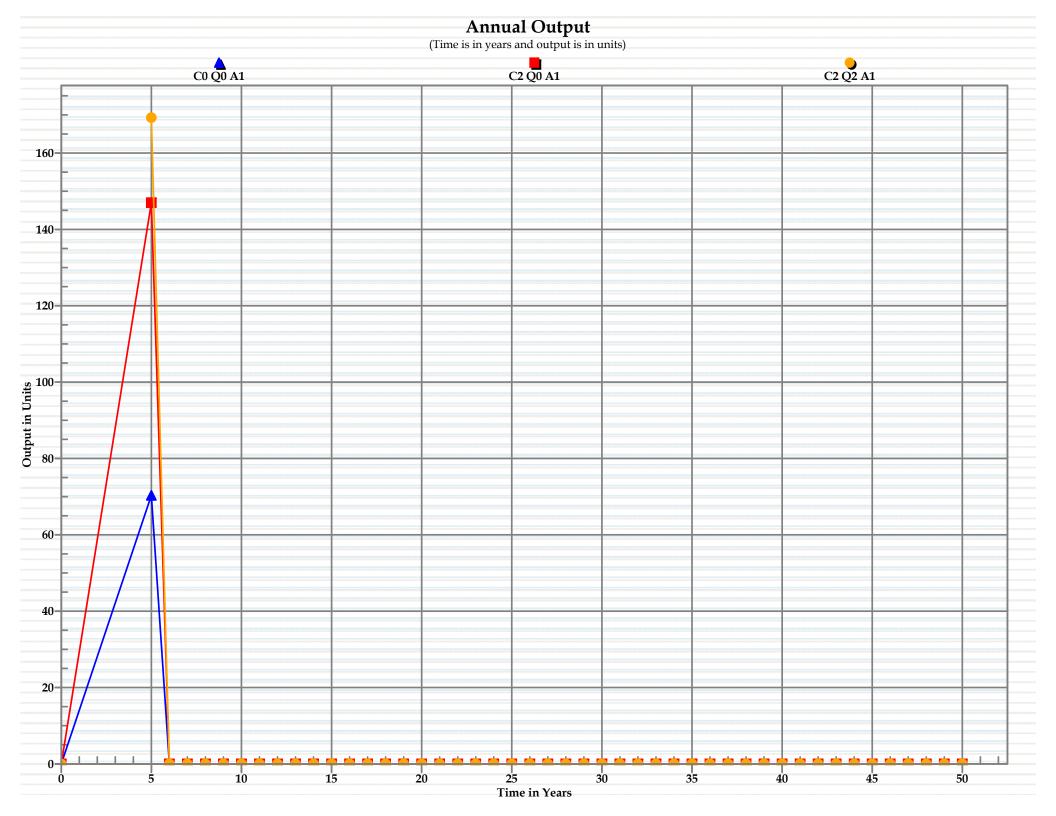
Max Output:146.99 unitsCalculation Method: Linear InterpolationPeriod of Analysis:50 yearsAverage Annual Output = 8.8194

| s: 30 years | Average Annual Output = 0.0194 |  |
|-------------|--------------------------------|--|
| Year        | Output Units                   |  |
| 0           | 0.00                           |  |
| 1           | 29.40                          |  |
| 2           | 58.80                          |  |
| 3           | 88.19                          |  |
| 4           | 117.59                         |  |
| _           | 146.99                         |  |
| ^           | 0.00                           |  |
| _           | 0.00                           |  |
| _           | 0.00                           |  |
| ^           | 0.00                           |  |
|             | 0.00                           |  |
| 4.4         | 0.00                           |  |
| 40          | 0.00                           |  |
|             | 0.00                           |  |
|             | 0.00                           |  |
|             | 0.00                           |  |
|             | 0.00                           |  |
|             | 0.00                           |  |
| 18          | 0.00                           |  |
|             | 0.00                           |  |
|             | 0.00                           |  |
| 21          | 0.00                           |  |
| 22          | 0.00                           |  |
| 22          | 0.00                           |  |
| 24          | 0.00                           |  |
| 25          | 0.00                           |  |
| 20          | 0.00                           |  |
| 27          | 0.00                           |  |
| 28          | 0.00                           |  |
| 29          | 0.00                           |  |
| 30          | 0.00                           |  |
| 31          | 0.00                           |  |
| 32          | 0.00                           |  |
| 33          | 0.00                           |  |
| 34          | 0.00                           |  |
| 35          | 0.00                           |  |
| 36          | 0.00                           |  |
| 37          | 0.00                           |  |
| 38          | 0.00                           |  |
| 39          | 0.00                           |  |
| 40          | 0.00                           |  |
| 41          | 0.00                           |  |
| 42          | 0.00                           |  |
| 43          |                                |  |
| 43<br>44    | 0.00<br>0.00                   |  |
| 44<br>45    | 0.00                           |  |
| 45<br>46    | 0.00                           |  |
| 46<br>47    | 0.00                           |  |
|             |                                |  |
| 48          | 0.00                           |  |
| 49          | 0.00                           |  |
| 50          | 0.00                           |  |
|             |                                |  |

**Initial Terms** 

Max Output:169.26 unitsCalculation Method: Linear InterpolationPeriod of Analysis:50 yearsAverage Annual Output = 10.1556

| 50 years | Average Annual Output = 10.1556 |  |
|----------|---------------------------------|--|
| Year     | Output Units                    |  |
| 0        | 0.00                            |  |
| 1        | 33.85                           |  |
| 2        | 67.70                           |  |
| 3        | 101.56                          |  |
| 4        | <u>135</u> .41                  |  |
| 5        | 169.26                          |  |
| 6        | 0.00                            |  |
| 7        | 0.00                            |  |
| 8        | 0.00                            |  |
| 9        | 0.00                            |  |
| 10       | 0.00                            |  |
| 11       | 0.00                            |  |
| 12       | 0.00                            |  |
| 13       | 0.00                            |  |
| 14       | 0.00                            |  |
| 15       | 0.00                            |  |
| 16       | 0.00                            |  |
| 17       | 0.00                            |  |
| 18       | 0.00                            |  |
| 19       | 0.00                            |  |
| 20       | 0.00                            |  |
| 21       | 0.00                            |  |
| 22       | 0.00                            |  |
| 23       | 0.00                            |  |
| 24       | 0.00                            |  |
| 25       | 0.00                            |  |
| 26       | 0.00                            |  |
| 27       | 0.00                            |  |
| 28       | 0.00                            |  |
| 29       | 0.00                            |  |
|          | 0.00                            |  |
| 31       | 0.00                            |  |
|          | 0.00                            |  |
| 33       | 0.00                            |  |
| 34       | 0.00                            |  |
| 35       | 0.00                            |  |
| 36       | 0.00                            |  |
| 37       | 0.00                            |  |
| 38       | 0.00                            |  |
| 39       | 0.00                            |  |
| 40       | 0.00                            |  |
| 41       | 0.00                            |  |
| 42       | 0.00                            |  |
| 43       | 0.00                            |  |
| 44       | 0.00                            |  |
| 45       | 0.00                            |  |
| 46       | 0.00                            |  |
| 47       | 0.00                            |  |
| 48       | 0.00                            |  |
| 49       | 0.00                            |  |
| 50       | 0.00                            |  |
| JU       | 0.00                            |  |



Appendix K
Post-Construction Monitoring Plan

## APPENDIX K

#### POST-CONSTRUCTION MONITORING PLAN

This monitoring plan is developed with the explicit intent to address the monitoring components and measures of success listed below. The project could be deemed a success if at least five of the following benchmarks were achieved:

- 1. Reduction in the frequency and abundance of nearshore, fast growth nuisance macroalgae (at least a 20 percent [%] reduction in percent cover or 25% reduction in days of occurrence).
- 2. Decrease in the abundance of seasonal macroalgae in the nearshore and mid-lagoon regions (at least a 20% reduction in percent cover).
- 3. Decrease in turbidity of nearshore waters, particularly following storm events (at least a 25% reduction in number of violations of Commonwealth of the Northern Marian Islands [CNMI] Division of Environmental Quality [DEQ] water quality standards for turbidity).
- 4. Decrease in microbial contamination in nearshore waters (at least a 25% reduction in number of violations of DEQ water quality standards for microbial contamination).
- 5. Decrease in nutrient levels in nearshore waters (at least a 25% reduction in number of violations of DEQ water quality standards for nutrients).
- 6. Decrease in contaminant (i.e., turbidity, microbial, and nutrient) concentrations in stormwater exiting the detention basins (at least a 25% reduction in number of violations of DEQ water quality standards for turbidity, microbial contamination, and nutrients).
- 7. Decrease in sediment load entering the Saipan Lagoon at mitigated drainages (at least a 10% reduction in sediment delta area).

Achievement of the first two benchmarks is less certain than the remaining five benchmarks because factors that are not directly linked to the proposed detention basins such as groundwater or other drainages may also affect the outcomes. The last five benchmarks are directly linked to the proposed detention basins and should be achieved by the project.

Site selection recommendations are based on an assumption of prevailing southerly, coast parallel current flows as provided by a three-dimensional current model created by the Secretariat of the Pacific Community (SPC) Applied Geoscience and Technology Division (SOPAC) (Damlamian and Kruger, 2010). Although current reversal is possible, dominant flow patterns suggest that the effects of discharge from restoration activities would be to the south and control sites would appropriately be located north of the mitigated drainage discharge. This plan further assumes that monitoring activities begin prior to construction and continue through five years post-construction. The following protocol provides direction on methods, site selection, frequency of sampling, and the benchmarks addressed by each component.

#### I. PRESENCE AND ABUNDANCE OF NEARSHORE NUISANCE MACROAGLAE

**Methods:** Two primary 'nuisance' algae are found along the shoreline in Saipan Lagoon: hair-like green algae, primarily growing during periods of increased freshwater input into the lagoon, and a wide variety of seasonal macroalgae. Both are addressed here. A permanent sampling area of 3 meters (m) by 50 m should be set up for each sampling series. A 0.5 m by 0.5 m quadrant will be haphazardly tossed inside the sampling area 25 times, moving away from the starting station. A series of tosses will be thrown on the beach and a second series of tosses thrown in the water just adjacent to the shore (Habitat 10). For each toss, the quadrant will be scored for the presence or absence of either the hairlike, green "Enteromorpha-form" algae, other seasonal macroalgae, or both.

**Site Selection:** One site, starting 30 m south of the mitigation drainage and continuing south, and a second control site, starting 30 m north of the mitigation drainage and continuing north.

Frequency of sampling: Weekly

#### Benchmark addressed and Criterion for Success: 1

1. Reduction in the frequency and abundance of nearshore, fast growth nuisance macroalgae (at least a 20% reduction in percent cover or 25% reduction in days of occurrence).

## II. REASSESSMENT OF THE INSHORE LAGOON AREA

**Methods:** This survey provides an evaluation of the dominant benthic cover, including seasonal macroalgae. Each survey site will be made up of five 50 m transects with each transect separated by 3 m gaps. These methods are based on standard protocols used by the CNMI Marine Monitoring Team (MMT) (Starmer and Houk, 2008).

A 0.5 m by 0.5 m quadrant with a six-point grid will be placed at 1 m intervals along the 50 m transects. Surveyors will score benthic substrate under each point. Averages, variances, and statistical power will be calculated based on the 50 m replicates. The benthic categories used for analysis will include corals (to genus level), turf algae (less than 2 centimeters [cm]), macroalgae (greater than 2 cm, genus level if abundant), coralline algae, branching coralline algae, invertebrates with more than 10% benthic coverage (grouped by genus), all other are invertebrates grouped together, and sand/bare substrate.

**Site Selection:** Sites should be located 100 m south (test) and north (control) in the middle portions (heading offshore) of Habitats 12, 14, and 16.

**Frequency of sampling:** Sampling frequency should be two times a year, in June and December. These dates coincide with the times of greatest and least abundance of seasonal macroalgae in the lagoon (Houk and Camacho, 2010).

## Benchmarks addressed and Criteria for Success: 1 and 2

1. Reduction in the frequency and abundance of nearshore, fast growth nuisance macroalgae (at least a 20% reduction in percent cover or 25% reduction in days of occurrence).

2. Decrease in the abundance of seasonal macroalgae in the nearshore and mid-lagoon regions (at least a 20% reduction in percent cover).

#### III. NEARSHORE LAGOON WATER SAMPLING AND RAINFALL DATA

**Methods:** The DEQ has an ongoing United States Environmental Protection Agency (EPA) approved nearshore water quality monitoring program that evaluates basic water quality parameters (salinity, dissolved oxygen [DO], temperature, hydrogen activity [pH], turbidity, and enterococci bacteria) on a weekly basis (Bearden et al., 2012). The DEQ lab is equipped to include orthophosphate and nitrate to this suite of parameters. The recommendation here is to utilize the existing program methodology with the addition of nutrients. Because of the potential of reversed nearshore currents affecting the results, a note regarding prevailing current at the time of sampling should be added.

**Site Selection:** If necessary, add a new test site 30 m southward of the mitigated drainage and use an existing, equivalently distanced DEQ site or create a novel site north of the drainage, as a control. At least one data logging rain gauge should be located in the watershed above and drain into the constructed mitigation measures.

**Frequency of sampling:** Parameters that are part of the current DEQ protocol should be measured weekly. Ideally, nutrients will be included in this, but if they are a novel monitoring parameter, a minimally monthly sampling frequency is recommended. The rain gauge should be set to log hourly rainfall. The data should be downloaded and the gauge maintained at least monthly.

## Benchmarks addressed and Criteria for Success: 3, 4, and 5

- 3. Decrease in turbidity of nearshore waters, particularly following storm events (at least a 25% reduction in number of violations of CNMI water quality criteria for Class AA marine waters for turbidity).
- 4. Decrease in microbial contamination in nearshore waters (at least a 25% reduction in number of violations of CNMI water quality criteria for Class AA marine waters for microbial contamination).
- 5. Decrease in nutrient levels in nearshore waters (at least a 25% reduction in number of violations of CNMI water quality criteria for Class AA marine waters for nutrients).

## IV. STORMWATER SAMPLING

**Methods:** The methods used for nearshore water sampling above may be applied to this monitoring effort and, again, nutrient sampling should be included. In addition, an effort should be made to capture the "first flow" of any given rainfall event and a second sample taken 15 minutes following the first sample. Sampling efforts for rainfall events that do not produce sufficient flow to allow sampling should still be noted.

**Site Selection:** A sampling site should be established at the inflow and at the discharge of each constructed detention basin.

**Frequency of sampling:** Frequency of stormwater sampling will be sporadic and dependent on storm/rainfall events. Given the uncertainty of any given rainfall event producing sufficient flow, effort should be made to capture all storm events possible, with a minimal number of 15 events over the course of the year.

## Benchmark addressed and Criterion for Success: 6

6. Decrease in contaminant (i.e., turbidity, microbial, and nutrient) concentrations in stormwater exiting the detention basins (at least a 25% reduction in number of violations of CNMI water quality criteria for Class AA marine waters for turbidity, microbial contamination, and nutrients).

#### V. RESURVEY OF SEDIMENT DELTAS

**Methods:** The sediment deltas in Saipan Lagoon are formed by sediment build up originating from the drainage watershed. They are the areas where the shoreline deviates away seaward, compared to the prevailing coastline in front of the drainage. A transect line laid parallel to the shoreline along the beach moat and across the delta can be used to define the landward extent of the delta. Once this is done, the seaward extent of the delta can be measured at 1 m intervals to define the outer perimeter of the delta and calculate the delta's area.

**Site Selection:** Drains 4, 6, and 11

Frequency of sampling: Annually

#### Benchmark addressed and Criterion for Success: 7

7. Decrease in sediment load entering the Saipan Lagoon at mitigated drainages (at least a 10% reduction in sediment delta area).

## VI. RISKS AND ADAPTIVE MANAGEMENT

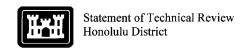
The results from this monitoring plan will be continuously assessed to closely monitor and evaluate the effectiveness of the project. Since the project goal is to restore a diverse natural system in which unpredicted events may occur during the course of the monitoring period or unknown/unpredicted factors may influence the outcome of the project, it is prudent to allow for adaptive management to be implemented if it becomes necessary. For example, if a large storm event takes place during construction of the project, it may be necessary to reevaluate the baseline conditions or to adjust the monitoring parameters and benchmark goals. If, in the event the project benchmarks are not reached at the end of the monitoring period, extensive post-construction may be warranted. New knowledge, inventories, research, and technologies, as it becomes available, will be considered during the process of adaptive management to best manage and evaluate the outcome of the project.

#### REFERENCES

- Bearden, C., D. Chambers, and R. Okano, 2012. May 2012 Draft Commonwealth of the Northern Mariana Islands Integrated 305(b) and 303(d) Water Quality Assessment Report. Saipan, Division of Environmental Quality. 115pp.
- Damlamian, H. and J. Kruger, 2010. Three dimensional wave-current hydrodynamic model for the management of Saipan Lagoon, Saipan, Commonwealth of the Northern Mariana Islands. Suva, SOPAC 73pp.
- Houk, P. and R. Camacho, 2010. Dynamics of seagrass and macroalgal assemblages in Saipan Lagoon, Western Pacific Ocean: disturbances, pollution, and seasonal cycles. Botanica Marina 53: 205-212.
- Starmer, J. and P. Houk, 2008. Marine and Water Quality Monitoring Plan for the Commonwealth of the Northern Mariana Islands. Division of Environmental Quality and Coastal Resources Management Office, Saipan, CNMI. 37 pp.

Appendix L Non-Federal Coordination

Appendix M
DQC/ATR Certifications



## STATEMENT OF TECHNICAL REVIEW

## COMPLETION OF DISTRICT QUALITY CONTROL/QUALITY ASSURANCE

The District has completed the Saipan Lagoon Aquatic Ecosystem Restoration Study, Island of Saipan, Commonwealth of the Northern Mariana Islands. Notice is hereby given that District Quality Control/Quality Assurance (DQC) has been conducted. During the DQC, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the result, including whether the product meets the customer's needs consistent with law and existing Corps policy. All comments resulting from DQC have been resolved.

Prepared by:

Milton T. Yoshimoto

Project Manager/CEPOH-PP-C

Date

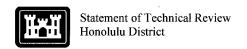
Approved by:

Michael F. Wong

Date

5/6/13

Chief, Civil Works Technical Branch



Review Team:

H&H/Design

for James Pennaz

SDD Quality Manager

CEPOH-EC

**Cost Estimating** 

Tracy W. Kazunaga

Cost Estimating Branch CEPOH-EQ-S

Real Estate

Stephen Cayetano Chief, Real Estate Branch

Environmental

Dan A. Nakamura

10 May 13 Date

Chief, Environmental Programs Branch

CEPOH-PP-E

Project Title: Saipan Lagoon Aquatic Ecosystem Restoration Study
Document: Draft Ecosystem Restoration Report/Environmental Assessment, Dated 10 Mat 2013
Review: District Quality Control Review

| Comment<br>No            | Page<br>Number | Line<br>Figure, or<br>Table No | Reviewer                   | Comment                                                                                                                                                                                                                                                        | Response                                                                                                                                                                                                                                                                                                                                                                                                     | Status           |
|--------------------------|----------------|--------------------------------|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Env-1 (EA)               | i-iii          |                                | D. Nakamura                | Check line spacing between topics for uniformity                                                                                                                                                                                                               | Concur. Line spacing will be checked and revised for uniformity.                                                                                                                                                                                                                                                                                                                                             | Closed           |
| Env-2 (EA)               | ES             | General                        | D. Nakamura                | Should include the section of WRDA that authorizes this project in the ES                                                                                                                                                                                      | Concur-The ES will be revised to specify that this project is a Continuing Authorities Program (CAP) section 206-Aquatic Ecosystem Restoration of WRDA. Concur. Line 29 will be revised to read:" Project related                                                                                                                                                                                            | Closed           |
| Env-3 (EA)               | V              | 29                             | D. Nakamura                | Need to mention that the short-term impacts would be mitigated to less than significant                                                                                                                                                                        | construction may result in significant short-term environment impacts which could be mitigated to less than significant."                                                                                                                                                                                                                                                                                    | Closed           |
| Env-4 (EA)<br>Env-5 (EA) | 1 2            | 19<br>18                       | D. Nakamura<br>D. Nakamura | See comment 2  Delete (adverse and beneficial)                                                                                                                                                                                                                 | Concur-Line 19 will be revised to specify that this project is authorized under Continuing Authorities Program (CAP) section 206-Aquatic Ecosystem Restoration of WRDA.  Concur.                                                                                                                                                                                                                             | Closed<br>Closed |
| Env-6 (EA)               | 17             | 14                             | D. Nakamura                | Add "Environmentally" to title                                                                                                                                                                                                                                 | Concur.                                                                                                                                                                                                                                                                                                                                                                                                      | Closed           |
| Env-7 (EA)               | 18             | 16                             | D. Nakamura                | The No Action also serves as the baseline for comparative analysis of impacts. This should be added.                                                                                                                                                           | Concur.                                                                                                                                                                                                                                                                                                                                                                                                      | Closed           |
| Env-8 (EA)               | 23             | 18                             | D. Nakamura                | Place cumulative impacts after indirect impacts                                                                                                                                                                                                                | Concur. Will include discussion on "Cumulative Impacts" after "Indirect Impacts".                                                                                                                                                                                                                                                                                                                            | Closed           |
| Env-9 (EA)               | 27             | 36                             | D. Nakamura                | Mention erosion control BMPs as mitigation                                                                                                                                                                                                                     | Concur. BMP relating to soil erosion controls will be added to section 3.1.2.                                                                                                                                                                                                                                                                                                                                | Closed           |
| Env-10 (EA)              | 38             | 4                              | D. Nakamura                | Under FWCA, the proponent is to give natural resources equal consideration not strong consideration to the views of FWS, etc.                                                                                                                                  | Concur. Section 3.7-Biological Resources will be revised to include clearer definition of FWCA, and will be moved to section 4.6 Fish and Wildlife Coordination Act                                                                                                                                                                                                                                          | Closed           |
| Env-11 (EA)              | 39             | 28                             | D. Nakamura                | Section 7 doesn't call for evaluation of impacts but consultation to determine effects of an action on T&E species and critical habitats.                                                                                                                      | Concur. Discussion of Section 7 ESA will be revised to include the comment, and will be moved to section 4.5 Endangered Species Act.                                                                                                                                                                                                                                                                         | Closed           |
| Env-12 (EA)              | 41             | 18                             | D. Nakamura                | Section 106 consultation also involves cultural and archaeological resources not just historic properties                                                                                                                                                      | include the comment, and will be moved to section 4.11 Section 106 NHPA.                                                                                                                                                                                                                                                                                                                                     | Closed           |
| Env-13 (ERR)             | 49             | 32                             | D. Nakamura                | If the restoration outcomes are dependent upon implementation of LUCs/BMPs by the local sponsor, then how are restoration outcomes attributed to the project alone. If this is not the case, then suggest changing "also depend on" to "will be augmented by". | success of the detention basins also depends on local implementation of land use controls and other BMPs for contaminant reduction in the West Takpochao watershed." has been revised to read:  "It is also important to note that success of the detention basins will be augmented by local implementation of land use controls and other BMPs for contaminant reduction in the West Takpochao watershed." | Closed           |

| Env-14 (ERR) | 50/51       |                 | D. Nakamura  | For, the LGHU calculation, please explain why identification of PCAs in Appendix B.5 included nutrient and sediment PCAs but the calculation of nutrient runoff is not considered and the sediment portion of the calculation is based on a Google Earth approximation and not on the identified sediment PCAs. This should be explained here. | sedimentation PCAs. Becuase of the limited number of nutrient PCAs identified, they were not included in the LGHU calculation considering that they would have a negligent effect on the outcome. The sediment portion of the LGHU calculation was based on Google Earth to include unvegetated/bare land in the upper watershed within the study area that were not necessarily counted as PCAs, considering that these areas would contribute a majority of sediments that is washed into the lagoon. The following explanation has been added in Page 57, line 25: "In addition to the runoff and hazardous waste PCAs, the PCA inventory identified several sedimentation and nutrient PCAs within the study area (Appendix B.5). Because of the limited number of nutrient PCAs that were identified within the study area, the calculation of nutrient runoff was not considered in the LGHU calculation. The small number of nutrient PCAs was considered to have a negligent impact on the outcome. The sedimentation factor calculation was based on Google Earth and not on the number of sedimentation PCAs to include unvegetated/bare land in the upper watershed within the study area that were not identified during the PCA inventory. This method was considered to result in a more accurate estimate of sedimentation that occurs within the study area." | Closed |
|--------------|-------------|-----------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
|              |             |                 |              |                                                                                                                                                                                                                                                                                                                                                | "The following maintenance activities should be conducted on an annual basis before the rainy season:  • cutting of grass and weed removal in and around the basin and within the outlet swales;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |
|              |             |                 |              |                                                                                                                                                                                                                                                                                                                                                | removal of accumulated sediment from the basin bottom to                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |
| _            |             |                 |              | Change bullet to read, "remove accumulated sediment from the basin bottom                                                                                                                                                                                                                                                                      | maintain designed capacity; and                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |        |
| Env-15 (ERR) | 60          | 6               | D. Nakamura  | to maintain designed capacity"                                                                                                                                                                                                                                                                                                                 | clearing of the basin inlet of debris, leafs, and any sediment."                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Closed |
| Env-16 (ERR) | General     |                 | D. Nakamura  | Should the FEA/FONSI be an appendix to the ERR?                                                                                                                                                                                                                                                                                                | Concur. The EA has been included as an appendix to the ERR.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Closed |
|              | General     |                 |              | The loss rate such as intiltration, evaporation, transpiration, etc. from storms is very high, sometimes exceeding 95% of rainfall. Please provide                                                                                                                                                                                             | Response provided by separate attachment. Reviewer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |
| H&H/Design-1 |             | Appendix A      | Jim Pennaz   | justification for this high loss rate.                                                                                                                                                                                                                                                                                                         | concurred. No report revision required.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Closed |
| CE-1         | 20111110111 | MII Estimate    | T. Kazunaga  | Verify Sales Tax Rate, Electricity, gas, & fuel rates.                                                                                                                                                                                                                                                                                         | Complied.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Closed |
| CE-2         |             | MII Estimate    | T. Kazunaga  |                                                                                                                                                                                                                                                                                                                                                | In Estimate.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Closed |
| OL-2         |             | wiii Latiiiiate | 1. Nazuriaya | 18" RCP: Missing cost for bedding? Dewatering cost line item may not be appropriate. Should use a dewatering                                                                                                                                                                                                                                   | III Estillate.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Closed |
| CE-3         |             | MII Estimate    | T. Kazunaga  | pump, laborer & diesel generator. Also, did you consider where the water is going to be disposed of?                                                                                                                                                                                                                                           | Complied.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Closed |
| CE-4         |             | MII Estimate    | T. Kazunaga  | Appears to not include any disposal cost or assumption where the excavated, cleared & grubbed material will be taken.                                                                                                                                                                                                                          | No disposal necessary on TSP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Closed |
| CE-5         |             | MII Estimate    | T. Kazunaga  | Is the assumption the prime will do all the work with no subcontractors?                                                                                                                                                                                                                                                                       | Yes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Closed |
| CE-6         |             | MII Estimate    | T. Kazunaga  | Where is the assumption the prime will be from?                                                                                                                                                                                                                                                                                                | Saipan.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Closed |
| CE-7         |             | MII Estimate    | ·            | Estimate does not appear to include cost for any permits or BMPs.                                                                                                                                                                                                                                                                              | Overhead Item.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Closed |
|              |             | MII Estimate    |              | Estimate does not appear to include mob/demob.                                                                                                                                                                                                                                                                                                 | Complied.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |

| CE-9  |    | MII Estimate | T. Kazunaga | Verify if any testing (such as water quality) will be required during construction     | Overhead Item.                                                                                                                                                      | Closed |
|-------|----|--------------|-------------|----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| CE-10 |    | MII Estimate | T. Kazunaga | Verify Prime Contractor Markup of 4.71% Excise Tax.                                    | Complied.                                                                                                                                                           | Closed |
| CE-11 |    | MII Estimate | T. Kazunaga | Please include Gov't Field office in the JOOH.                                         | Complied.                                                                                                                                                           | Closed |
| CE-12 |    | СРМ          | T. Kazunaga | Submittals: Generally, FSRO requires at least 4 months submittal period. Please revise | Total of 4 months included.                                                                                                                                         | Closed |
| CE-13 |    | CPM          | T. Kazunaga | Does the schedule consider any rain delays?                                            | Added.                                                                                                                                                              | Closed |
| CE-14 |    | СРМ          | T. Kazunaga | Please indicate how the midpoint of construction for escalation was calculated.        | Changed.                                                                                                                                                            | Closed |
| CE-15 |    | CPM          | T. Kazunaga | Please indicate when the PPA, real estate acquisition, will be obtained.               | Complied.                                                                                                                                                           | Closed |
| CE-16 |    | TPCS         | T. Kazunaga | Verify if EPL is 1 Oct 2015 or Oct 2012.                                               | Oct 2012                                                                                                                                                            | Closed |
| CE-17 |    | TPCS         | T. Kazunaga | TPCS does not include any escalation.                                                  | Complied.                                                                                                                                                           | Closed |
| CE-18 |    | TPCS         | T. Kazunaga | How was 30% Contingency optained for Real Estate? It is not on the CSRA.               | Used it from a previous project, will change.                                                                                                                       | Closed |
| CE-19 |    | TPCS         | T. Kazunaga | Cont. for PED & CM does not match CSRA.                                                | Changed.                                                                                                                                                            | Closed |
| RE-1  | 5  | Line 5       | McDonald    | Will the COE RE ID the owners and by what means                                        | No, the local sponsor will identify the owners and acquire the lands                                                                                                | Closed |
| RE-2  | 5  | Line 28      | McDonald    | No cost est. for demolishing of min. func. BLDG                                        | The local sponsor is responsible for the acquisition of lands and buildings                                                                                         | Closed |
| RE-3  | 5  | Line 47      | McDonald    | Who will conduct the tile search and is the est. cost included                         | The local sponsor will conduct the title search and costs of that effort.                                                                                           | Closed |
| RE-4  | 10 | Line 31      | McDonald    | Who or what is "fully capable" finding based on                                        | An assessment of the sponsor's acquisition capabilities to acquire the land necessary for this project has not been done. However, CNMI is considered fully capable | Closed |