

# TINIAN HARBOR MASTER PLAN

Commonwealth Ports Authority

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In Association With | PEGS and Micronesian Environmental Services, Inc.



# TINIAN HARBOR MASTER PLAN

For: Commonwealth Ports Authority

Date: April 2018

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## Glossary of Acronyms and Abbreviations

<b>ASCE</b>	American Society of Civil Engineers
<b>BECQ</b>	Bureau of Environmental and Coastal Quality
<b>BIG</b>	Bridge Investment Group
<b>CNMI</b>	Commonwealth of The Northern Mariana Islands
<b>Corps, USACE</b>	U.S. Army Corps of Engineers
<b>CPA</b>	Commonwealth Ports Authority
<b>cy</b>	Cubic Yard
<b>CZMA</b>	Coastal Zone Management Act
<b>DFW</b>	Division of Fish and Wildlife
<b>DOD, DoD</b>	Department of Defense (U.S.)
<b>DSCR</b>	Debt Service Coverage Requirement
<b>EA</b>	Environmental Assessment
<b>EPF</b>	Expeditionary Fast Transport Vessel
<b>EIS</b>	Environmental Impact Statement
<b>ESA</b>	Endangered Species Act
<b>ft</b>	Feet
<b>ITB</b>	Integrated-Tug-Barge (cargo vessel)
<b>kg</b>	Kilograms
<b>LAT</b>	Lowest Astronomical Tide
<b>m</b>	Meters
<b>M&amp;N</b>	Moffatt & Nichol
<b>MARFORPAC</b>	Marine Corps Forces, Pacific
<b>MHW</b>	Mean High Water
<b>MLLW</b>	Mean Lower Low Water
<b>mm</b>	Millimeters
<b>MMPA</b>	Marine Mammal Protection Act
<b>MSC</b>	Military Sealift Command (U.S.)
<b>MSL</b>	Mean Sea Level
<b>NEPA</b>	National Environmental Policy Act
<b>NOAA</b>	National Oceanic And Atmospheric Administration
<b>NPDES</b>	National Pollutant Discharge Elimination System
<b>Ro-Ro</b>	Roll-On, Roll-Off
<b>ROM</b>	Rough Order of Magnitude
<b>TEU</b>	Twenty-foot Equivalent Unit
<b>USACE</b>	U.S. Army Corps of Engineers
<b>USCG</b>	United States Coast Guard
<b>USEPA</b>	U.S. Environmental Protection Agency
<b>USFWS</b>	U.S Fish and Wildlife Service
<b>UXO</b>	Unexploded Ordnance
<b>WIS</b>	Wave Information Study
<b>WGS84</b>	World Geodetic System 1984
<b>WQC</b>	Water Quality Certification

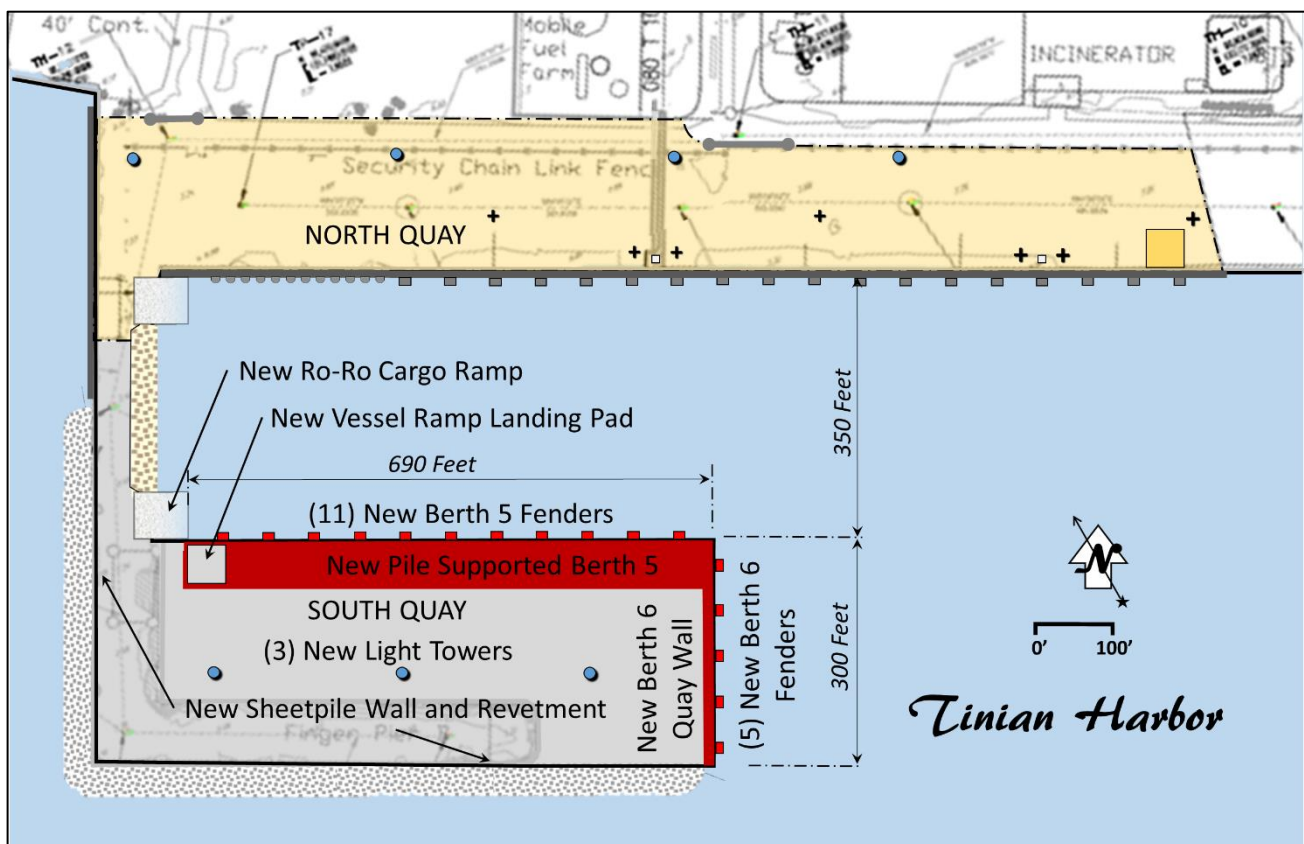
# Executive Summary

## INTRODUCTION AND BACKGROUND

The Commonwealth Ports Authority engaged Moffatt & Nichol (M&N) to develop a master plan for Tinian Harbor that would accommodate reasonable demand-driven growth and improve the island economy. The master plan includes provisions for commercial harbor operations, recreational boating and upland commercial development.

It is presented here as a comprehensive study of the port that includes short, medium, and long-term plans for repair, maintenance and development of the port and associated upland areas. It provides a framework to guide future port development that forms a cost-effective program to satisfy projected future demand, while considering potential environmental and socioeconomic impacts. Short term recommendations include improvements that are needed now and should be planned and initiated this year. Medium term improvements should be planned and funded now and constructed over the next five years to meet the needs of the island. Given the population and economic projections for Tinian, long term improvements will only be needed if a permanent U.S. Military presence on Tinian requires a dedicated berthing and operating area.

The harbor layout shown below was developed to accommodate all of the commercial traffic projected for the coming 20-year planning horizon as well as allow for future growth and increased military use of the harbor.



This harbor development plan is accompanied by a plan for upland, non-port activities on adjacent CPA parcels located farther from the commercial seaport. A shift in island demographic, on-dock and near-dock activities, and military uses, prompted the following recommended upland development needs:

- An open marketplace for Tinian small merchants that is within close walking distance from the new hotel and casino complex.
- A parcel dedicated to commercial retail, restaurant, and entertainment activities that is also accessible from the casino.
- Future cargo marshalling, storage and value-added laydown area adjacent to the commercial port.
- Relocation of non-waterfront dependent activities such as fuel storage and waste incineration away from the waterfront. This has the added benefit of placing such activities away from the hotel and casino complex.
- Reserve and development of public access small boat and recreational area that can also be used for fishing, diving and sight-seeing charters.

These development recommendations are illustrated in the following diagram:



The proposed improvements are estimated to cost \$111.2 M (2016 dollars) and could be phased in over 20 years as funds become available and needs emerge. The most significant cost - \$61M for the development of the South Quay - would be for a long-term military need and mission.

Together, the Tinian Harbor Master Plan represents a cost-effective and needs-driven program for port enhancement at the CPA facilities on Tinian.

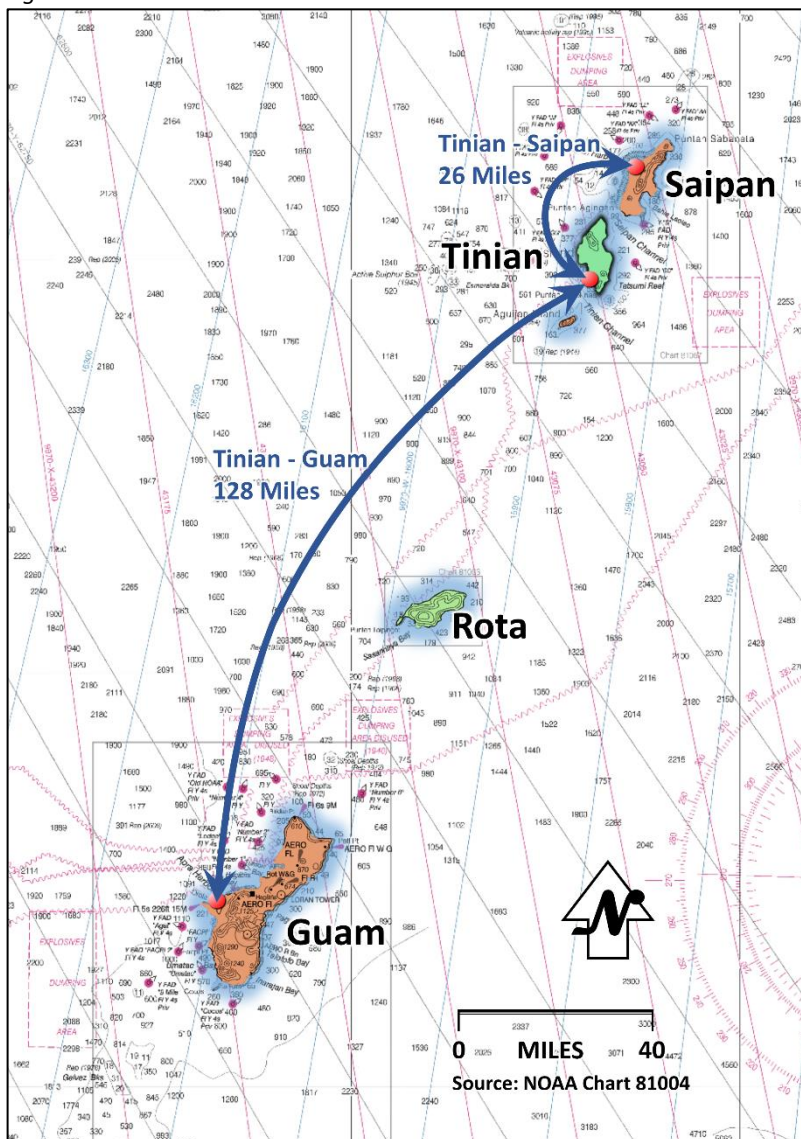
# 1.0 Introduction

## 1.1. Background

### 1.1.1. General Demographics

Tinian is one of the three principal islands of the Commonwealth of the Northern Mariana Islands (CNMI). Together with uninhabited neighboring Aguijan, it forms Tinian Municipality, one of the four constituent municipalities of the Northern Marianas. Most residents live in San Jose, Tinian's largest village. Tinian Island has a land area of 39 square miles, with its highest elevation at Mount Lasso at 561 ft. It had a population of 3,136 as of 2010, corresponding to five percent of Northern Mariana Island residents, and a population density of 80 people per square mile. About 75% of the inhabitants are Chamorros or members of various other ethnicities of the Caroline Islands. There are also minorities of Filipino, Bangladeshi, East Asian and European-descended people<sup>1</sup>.

Figure 1-1: Tinian Location



<sup>1</sup> <https://en.wikipedia.org/wiki/Tinian>

### **1.1.2. Location**

Tinian is almost six miles southwest of Saipan, across the Saipan Channel, and over 90 miles northeast of Guam (Figure 1-1). However, Tinian Harbor is approximately 26 miles by sea from Tanapag Harbor on Saipan, and 128 miles northeast across the Philippine Sea from Apra Harbor on Guam.

### **1.1.3. Political Subdivision**

The 1976 Covenant creating the CNMI established jurisdiction of U.S. laws, agencies, and programs; provided for a CNMI Constitution, an elected government and defined self-rule; and granted U.S. citizenship to CNMI residents. In 1983, a lease agreement was signed that gave the U.S. Department of Defense control and possession over 16,100 acres of northern Tinian known as the Military Lease Area (MLA). The lease agreement is for 50 years, with a renewal option for an additional 50 years. Presently, the U.S. military uses major portions of the leased land area for training exercises.

A portion of the MLA has been leased back to the CNMI for uses judged by the Navy to be compatible with Department of Defense uses, primarily grazing and agriculture. Under the leaseback agreement, this area may be used for training activities that would not be detrimental to ongoing CNMI economic and agricultural activities.

### **1.1.4. Economy**

The largest employer on the island is the Commonwealth Government. Although the local economy of Tinian has had a strong tourism sector, several factors have contributed to its decline. First, a private ferry service from Saipan to Tinian, which was operated by Tinian Shipping & Transportation since 1996, closed in 2010 due to financial issues. Second, the Dynasty Hotel and Casino closed in September of 2015 due to a money-laundering conviction against its owners.

Since closure of the Tinian Dynasty Hotel and Casino, other tourist infrastructure has remained relatively undeveloped. The village of San Jose has several smaller hotels and restaurants that cater mostly to local visitors. In addition to government functions and tourism, agriculture is important to the island, but most produce is consumed locally.

### **1.1.5. Commercial Airport**

With an 8,600-foot runway, Tinian Airport is large enough to accommodate international flights. However, it is normally open only to shuttle flights from Saipan. Passenger facilities include about 50,000 square feet of arrival, departure, and administration spaces, in addition to parking and passenger vehicle lanes. There is no airport taxi service or other public transportation on the island. However, cars are available for rent at the airport.

The air terminal is attended from 6:00 a.m. to 7:00 p.m., with other hours available by arrangement with the airport manager. However, there is no air traffic control at the airport, and arriving aircraft must follow Visual Flight Regulations. Immigration and customs agents are available during scheduled operations. At other times, prior arrangements must be made with the Chief of Immigration on Saipan. Aircraft arrivals having more than 10 passenger seats per plane require written authorization obtained 24 hours in advance.

### **1.1.6. Tinian Harbor in Sunharon Roads**

Sunharon Roads includes both the inner portion of Tinian Harbor near the town of San Jose, and the area lying up to 1.5 miles offshore between Garguan Point and Carolinas Point. This area has been swept for unexploded

ordnance (UXO) to various depths between 15 feet and 55 feet, the lesser depths being nearer the shore. Anchorages are available in this outer area. The inner harbor is entered via a channel which has a design navigable width of 500 feet. Although authorized channel was once dredged to 30 feet, the CPA reports a working depth of 25 feet for the harbor and berthing area.

Figure 1-2: Tinian Harbor and Sunharon Roads

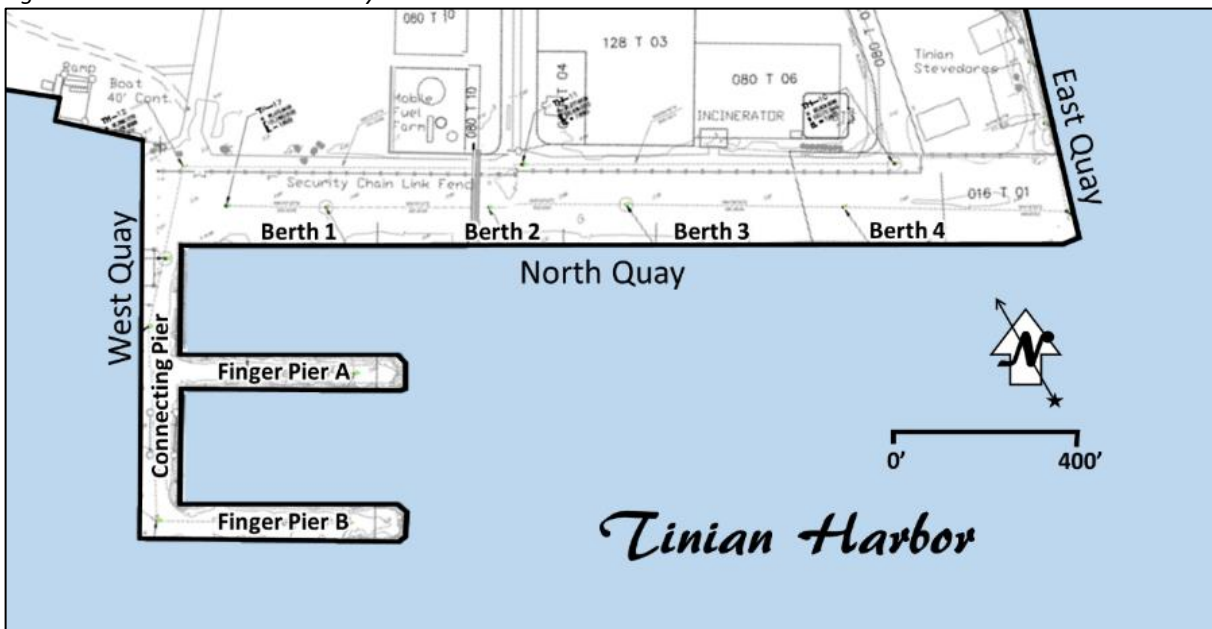


Tinian Harbor includes the North Quay that functions as the CPA commercial port for the island. It was repaired once in 1980 and again in 2011. The usable length is 1,400 feet in three contiguous berths. The center berth, Berth 2, was upgraded to better accommodate small tanker vessels during the most recent round of berth repair.

Berths 1, 2 and 3 have a depth alongside that varies between 25 feet and 29 feet. The North Quay also includes Berth 4 that is under long-term lease to Bridge Investment Group (BIG) for development as a casino and hotel complex and is therefore not available for other commercial uses. Adjacent to Berth 4, BIG has also leased the East Quay as part of its development.

On the northwest side of the harbor there is also a portion of the commercial port designated as the West Quay. This wharf includes about 380 feet of improved bulkhead. However, the water is relatively shallow, being five feet or less. In addition to the quays, the Tinian commercial harbor includes Finger Piers A and B, along with a Connecting Pier. These piers, constructed in 1945, have seen little maintenance since. They have fallen into disrepair and are largely unusable. A Ro-Ro ramp on the connecting pier was built sometime in the 1990s and is in active use for landing and loading construction equipment.

Figure 1-3: Tinian Inner Harbor Layout



A small craft harbor is located west of the Connecting Pier that includes 10 floating slips for boats 20 to 25 feet in length. It also includes an 85-foot marginal floating dock that can receive larger vessels. A small Ro-Ro ramp has been constructed between the two floating docks and a public boat launch ramp is located west of the marginal float. At one time, this harbor was protected by a sheet-pile breakwater. However, that structure has since deteriorated and most of the wave protection from the west is provided by the natural fringing reef.

To the southwest of the commercial harbor, a free-standing breakwater protects the berthing area from wave action. This breakwater was constructed in 1945 at the same time the harbor facilities were built and is nearing the end of its useful life. Although the breakwater has sustained some damage, it still provides an effective barrier against wave and swell action. Beyond the breakwater, an anchorage area with locations for 45 vessels has been designated. Point Diablo on the northwest provides this anchorage with some shelter from waves originating in the Philippine Sea. Although the inner harbor at Tinian is protected against both wind and wave action under most conditions, it cannot be considered a harbor of refuge during the close passage of typhoons due to the deteriorated condition of the breakwater.

## **1.2. Master Plan Objectives**

The Tinian Harbor Master Plan is a comprehensive study of the port that includes short, medium, and long-term plans for repair, maintenance and development of the port and associated upland areas. It provides a framework to guide future port development that forms a cost-effective program to satisfy projected future demand, while considering potential environmental and socioeconomic impacts. Short-term recommendations include improvements that should be planned and initiated this year, and are needed now. Medium term improvements should be planned and funded now and constructed over the next five years to meet the needs of the island. Given the population and economic projections for Tinian, long term improvements will only be needed if a permanent U.S. Military presence on Tinian requires a dedicated berthing and operating area.

The Master Plan documents the important issues and provides a summary of needs that the proposed development will address. It also includes consideration of the possible environmental and socioeconomic costs associated with alternative development concepts, and the possible means of avoiding, minimizing, or mitigating impacts to sensitive resources at the appropriate level of detail for facilities planning.

Findings are presented in a graphical and narrative format that describes development of the port and anticipated land uses in the vicinity of the port. They include a realistic schedule for the implementation of the development proposed in the plan, particularly the short-term capital improvement program. This capital improvement program is supported by a financial plan and implementation schedule.

Environmental and regulatory issues are addressed in sufficient detail for subsequent environmental evaluations that may be required before the project is approved. These details include discussion of the studies and permit requirements needed for local, CNMI, and U.S. Federal regulations.

## **1.3. Public Information and Stakeholder Input Meetings**

This section includes findings of meetings held in the summer of 2016 by the Tinian Harbor Master Plan project team and by the U.S. Army Corps of Engineers (Corps). These findings include statements made by meeting participants that reflect their own opinions, thoughts, and experiences. The statements contained in Section 1.3 are, therefore, simply records of statements and have not been verified by the project team.

A second set of meetings were held in March 2018 to present the draft Tinian Harbor Master Plan to the public and other stakeholder groups and to receive feedback on the Master Plan draft.

The following sections provide a summary of the salient points from the 2016 meetings. The complete *Notes of Meeting* documenting the 2016 and 2018 meetings can be found in Appendix D.

### **1.3.1. US Army Corps of Engineers Scoping Meeting: 19-20 July 2016**

Over July 19<sup>th</sup> and 20<sup>th</sup>, 2016, the Corps engaged Tinian residents and CPA/CNMI stakeholders in a series of project scoping meetings. The Corps is considering dredging, channel improvements, and harbor protection structures at Tinian, Rota and Saipan. The minutes of these meetings, as they pertain to Tinian, have been combined and summarized by topic in the following paragraphs.



## **Dredge Depth**

Although the design dredge depth of the original construction was 28 feet in the harbor and 35 feet in the channel, the most recent dredging was to 26 feet in the harbor and 30 feet in the channel. If it is found necessary, the Corps can maintain Tinian Harbor to 28 feet and channel to 35 feet under the current authorization.

Calling ships are said to have grounded in the past. In order to access the harbor, larger vessels such as the Mobil tankers arrive light-loaded. Cruise ship operators have also expressed interest in calling at Tinian, but depth is an issue. If CPA can document the interest (provide info on company and intended use/operations, when and how often), then the Corps can determine the potential benefits of a deeper harbor.

Hydrographic survey of Tinian Harbor is performed every five years. If there is a storm, or feedback by the users, the Corps will conduct a survey to see if it has impacted operations. An upcoming hydrographic survey will be performed as soon as possible, either in house or by private contractor.

## **Breakwater Repair**

The Corps will perform modeling to assess the circulation of the harbor basin and consider a flow-through on the north side of the breakwater to address water quality considerations. Modeling will also allow exploration of multiple breakwater configurations to evaluate water quality, environmental, and marine life impacts. A southern breakwater extension could be considered. However, this may be problematic as the nearby beach is used for marine turtle nesting.

Tinian citizens have expressed the desire for use of the breakwater; for instance, the addition of walkways and lighting. These improvements are costly and can be incorporated into the design, but must be requested by CNMI. In particular, they must specify the intended activity, and address safety and liability issues.

Economic evaluation of breakwater repair/improvement costs are based on a 50-year life, since most marine structures should be designed to still be functional within that time period. Climate change is incorporated in the modeling and the structures would be designed to withstand a 50-year storm event.

Back-to-back typhoon occurrences may have changed the channel depth. An update to the 2013 hydrographic survey conducted by the Corps may be required. The no action alternative must consider the possibility of being one typhoon away from having the breakwater disappear, which would result in economic and environmental detriments.

## **Dredging Costs**

Tinian Harbor structures are not maintained by the Corps. Dredging the Tinian Channel and turning basin is the responsibility of the U.S. federal government, however, outside the federal channel, berthing areas and finger piers need to be dredged by the CPA. Cost sharing is based on depth. For areas less than 20 feet deep, the federal share is 90%. For areas between 20 feet and 40 feet, the federal share is 75%. Any remainder is the responsibility of the CPA.

## **Small Boat Harbor – New Dredged Channel**

Tinian stakeholders would like to include a new small boat harbor entrance through the north breakwater that would require channel dredging. This was not considered as a big need previously and the additional benefit is

not known. Corps participants stated that if justification for the cost and environmental concerns of the new small boat channel cannot be found, then it may not be feasible.

### **Military Ship Restrictions**

Corps participants noted that all Marine Corps ships brought in are chartered vessels which do not require a security zone. Some military vessels need a security radius and sensitive military ships may call in the future. It is not known if private vessels would be impacted by channel restrictions if sensitive military ships are in the harbor.

MARFORPAC is providing vessel information and is consolidating information from other military sources as well. The CPA needs to know the frequency, time in port, and any security restrictions. This will determine if impacts can be expected to the commercial port and small boat marina.

### **1.3.2. On-Site Coordination Meeting: 25 October 2016**

The Tinian Harbor Master Plan team met with the Commonwealth Ports Authority to develop a vision for the master plans for Tinian Harbor and Rota West Harbor. The minutes of this meeting, as it pertains to Tinian, have been combined and summarized by topic in the following paragraphs. (Note: at the time this meeting was held, Alter City Group (ACG) was moving forward with its plans for casino development and initiation of a passenger ferry service. ACG has subsequently delayed its project and may abandon it.)

#### **Harbor Condition**

The condition of piers and breakwater at Tinian Harbor are the greatest concern to the CPA, as well as funding the future port development and repairs.

#### **Casino Development**

Two new casinos are planned for Tinian. BIG has leased a portion of the port property and begun site clearing and construction at Tinian Harbor Berth 4 and the East Quay. Alter City Group Incorporated is in the late stages of permitting for a casino between the harbor and the airport. The existing Dynasty Casino closed recently due to financial issues and is not expected to reopen in the near-term. The CPA believes that the new casinos could prompt direct flights from China. Currently there is no Customs and Border Protection (CBP) presence at the Tinian airport. Cargo capacity on the direct flights could change the cargo mix from Saipan to Tinian.

The two new casinos each intend to engage a ferry operator to provide shuttle service between Saipan and Tinian. The ACG ferry is currently planned to be passenger and passenger vehicle only. However, the BIG ferry will include commercial vehicles as well. Whereas ACG will need to land passengers at a CPA facility, BIG intends to develop a ferry terminal as part of its casino complex.

#### **Needs and Planned Expansion**

Future Department of Defense's (DoD) plans include more vessel calls with a potential impact to port operations. DoD material lay-down has at times congested the available port area. With new casino construction underway, staging construction material will become more difficult.

Planned terminal improvements include a seawater firefighting system with hydrants on the terminal to replace the current practice of calling an airport fire truck to standby at the port during fuel operations. BIG will also be

constructing three new buildings for CPA on port property to replace the buildings demolished as part of the casino construction. BIG is also considering a yacht leasing service and possibly a floating casino.

Since Tinian Harbor currently has unused land available for development, CPA will not be acquiring properties outside of those it currently owns for future harbor development or expansion. However, CPA leases land to others which CPA could reacquire, if necessary.

### **Other Information Developed at the Meeting**

CPA committed to provide cargo and passenger data and other information needed to prepare the cargo and passenger projections, the port financial data and funding options needed for the financial analyses.

A recently enacted wharfage law disallows collection of wharfage fees for cargo offloaded in Rota and Tinian which originated in Saipan.

CPA stated that they will coordinate a meeting between the Tinian Port Master Plan team and CPA's consultant for the Saipan Master Plan (with GHD) at the Port of Saipan Conference Room.

The Corps stated that their Feasibility Study will be reaching *Decision Point 2 - Concurrence on its Tentatively Selected Plan* in June 2017. Completion of the CPA master plan should coincide with the Corp's Tentatively Selected Plans to ensure concurrence between the recommended plans.

### **1.3.3. Coordination Meeting with Tinian Ports Manager: 27 October 2016**

The M&N team met with the Tinian Port Manager at the Tinian Airport to discuss current operations and plans at Tinian Harbor. Statements here reflect the CPA's understanding of the issues at the time of the meeting, but may conflict with statements made by other stakeholders. The minutes of this meeting have been combined and summarized by topic in the following paragraphs.

#### **Bridge Investment Group Development**

Bridge Investment Group has applied for permits for the construction of a new hotel and casino at the port. The development would occupy roughly a third of the southern section of the existing port property. The site has already been fenced off and the former operations building inland of the wharf has already been demolished. BIG is currently constructing three buildings for CPA at the port to accommodate port operations that will be affected by the construction of BIG's new development. Permits are currently being sought by BIG for construction of the hotel and casino.

A priority for BIG is the initiation of roll on/roll off (RO/RO) and passenger ferry service between Saipan and the proposed new hotel and casino. The ferry is envisaged to homeport in Tinian along the length of the Tinian wharf secured by BIG.

#### **Alter City Group Development (ACG)**

The Port Manager stated that ACG has obtained permits and is set to begin construction of a new hotel and casino northwest of the harbor in Puntan Diablo at the end of 2016<sup>2</sup>. ACG hopes to run a passenger and

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<sup>2</sup> ACG has since revised their plans and may pull out of the casino project

passenger vehicle ferry between Saipan and Tinian Harbor. A Saipan-Tinian ferry was formerly run out of Charlie Dock on Saipan but service stopped a few years ago.

### **Department of Defense (DoD)**

The U.S. Navy has expressed a need to use the harbor 36 weeks out of the year, and the U.S. Air Force has expressed a need to use the harbor 11-12 weeks out of the year. Explosive Safety Quantity-Distance (ESQD) procedures may need to be considered during off loading and staging of munitions at the port. To date, however, specific information has not been provided to CPA by DoD regarding the quantity of explosives, planned operations, ESQD standoff distance arcs, etc. on which CPA may base its planning.

### **Small Boat Marina**

The small boat facility to the northwest of the commercial piers is operated by the CNMI Department of Lands and Natural Resources (DLNR), Fish and Wildlife Division, but the marina and land is owned by CPA.

### **Free Trade Zone (FTZ)**

The CPA has the authority to designate and establish a Free Trade Zone (FTZ) although it has not yet designated one on Tinian. An FTZ near the northern end of the Tinian Harbor breakwater has been discussed within CPA. An FTZ near the Tinian International Airport has also been discussed within CPA.

### **Port of Tinian Comments**

The federally authorized dredge depth of the channel is 35 feet. However, the current depth of channel is approximately 30 to 35 feet. The federally authorized dredge depth of the turning basin is 28 feet, and current depth of turning basin is approximately 24 feet.

The closing of Tinian Dynasty Hotel & Casino has had a significant impact on visitors and cargo volumes on Tinian.

Based on current fuel delivery, Tinian has approximately 45 days of fuel available to operate its power plant. The Tinian power plant is currently producing 2.5MW of peak energy although it was producing 5MW of electricity while the Tinian Dynasty Hotel and Casino was operating. Currently, International Broadcasting Bureau's Voice of America is a primary power purchaser on Tinian.

A new wastewater treatment plant outside of the CPA harbor property on Commonwealth Utilities Corporation (CUC) property has been proposed.

Cruise ships calling Tinian Harbor was discussed while the Tinian Dynasty Hotel & Casino was still operating. The Port of Tinian still receives occasional inquiries from cruise ship companies about the depth of the channel and harbor but after the depths have been conveyed, the discussion has stopped. CPA assumes the depth of the existing channel and harbor may not be favorable to the cruise ship companies.

#### **1.3.4. Alter City Group (ACG): 27 October 2016**

The M&N team met with the Alter City Group Construction Management Team to discuss the current status of the planned casino near Tinian Harbor. Statements made in that meeting reflect the Alter City Group opinion and plans at the time of the meeting. The minutes of this meeting have been combined and summarized by topic in the following paragraphs.

## Construction

ACG has obtained permits and is set to begin construction of a new hotel and casino in Puntan Diablo in December 2016 or the first quarter of 2017, dependent on notice to proceed approval<sup>3</sup>. The earthmoving permits and notice to proceed for Phase 1A and Phase 1B have been issued. The master siting permit for grubbing and full-scale clearing is currently being reviewed. ACG hopes to have this permit approved by November 2016.

Beginning on 01 October 2016, the U.S. federal government began enforcement of provisions of the *Federal Mine Safety and Health Act of 1977* which establishes mandatory health and safety standards that govern the nations' mines. Since the local Tinian quarries do not currently comply with all the required provisions, local aggregate for concrete is currently not available on Tinian, which would adversely affect ACG's planned construction.

## Employment

ACG is seeking to hire 200 persons for the first group of workers until construction gets into full swing. It expects to incrementally hire a total of 700 – 1000 workers that will eventually be needed at the height of the project construction. Workers will be housed in temporary worker housing. The CNMI-Only Transitional Worker Cap is making the hiring of skilled workers difficult but other strategies to hire the manpower needed for the construction are being undertaken.

## Ferry Service

ACG hopes to run a passenger and passenger vehicle ferry between Saipan and Tinian Harbor. They have selected a ferry design and hired a ferry consultant. ACG envisages the ferry to homeport in Tinian. A ferry terminal would be needed in Tinian to process passengers. It is unlikely that shared use of the ferry terminal being proposed by Bridge Investment Group (BIG) would be feasible since BIG's terminal would be on land that will be leased by BIG.

The ACG ferry will accommodate passenger vehicles as well as walk-on passengers, but will not have room or clearance for buses and trucks. The new ferry service is envisaged to be similar to the ferry that operated when the Dynasty Hotel & Casino was in business. ACG would provide bus shuttle service between Tinian Harbor and its hotel and casino. It is ACG's understanding that if a foreign-made vessel is inspected and certified to meet the necessary standards, the vessel would be allowed to operate.

## Other

The CPA has been granted the right to establish a Free Trade Zone (FTZ) on Tinian. However, CPA has not yet designated a site. ACG expressed initial interest if / when warehousing in an FTZ is established.

### 1.3.5. Bridge Investment Group (BIG): 27 October 2016

The M&N team met with the Bridge Investment Group Construction Management Team to discuss the current status of the planned casino at Tinian Harbor. Statements made in that meeting reflect BIG's opinion and plans at the time of the meeting. The minutes of this meeting have been combined and summarized by topic in the following paragraphs.

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<sup>3</sup> ACG has since revised their plans and may pull out of the casino project

## **Construction Phasing**

BIG is in the process of seeking permits for the construction of a new hotel and casino at Tinian Harbor. The development would occupy roughly one-third of the North Quay and existing port property.

- Phase 1 of the BIG development will be a ferry terminal at Berth 4 of the North Quay. A retractable mooring structure would extend from the quay for mooring the ferry at berth and the ferry is outfitted with a stern ramp to support RO/RO capability.
- Phase 2 of BIG's proposed development is the construction of the hotel in the northwest corner of the leased property. BIG is hoping to begin construction in June 2017 and estimates construction of the hotel to require approximately 16-months.
- Phase 3 of BIG's proposed development is the construction of the Titanic-replica casino, water features, and other support structures.

## **Construction Status (as of October 2016)**

BIG's design has progressed through the design development phase but BIG is awaiting permits and other approvals before moving into construction documents. The current development plan is contingent upon the ability to close the Federal Highways Administration (FHWA)-designated territorial road that currently bisects the BIG site. BIG's proposed development will include a roll on/roll off (Ro-Ro) and passenger ferry service between Saipan and Tinian.

## **Proposed Ferry Service**

A ferry operating company has been established to provide service from Tinian to Saipan. The company hopes to home-port their vessel at Tinian Harbor. BIG is a shareholder of the ferry company but the ferry company will be independent of the hotel and casino operations. The BIG ferry would be open to the public and other businesses so use of the ferry would not be limited to only BIG's operations. The company would like to initiate ferry service between Saipan and Tinian in March 2017.

## **Port Operations and Cargo Needs**

BIG is concerned about the impact that cargo and military operations at the commercial port may have on the experience of its hotel and casino guests. BIG is reviewing sight lines from the proposed hotel and casino and considering plans for mitigating sight line concerns. BIG is also looking into the feasibility and viability of mooring a temporary 180-room floating hotel and casino at North Quay Berth 1 after the implementation of Phase 1.

BIG expects to have an estimate of the quantity of construction materials needed for the proposed new hotel and casino development available in December 2016 / January 2017. BIG anticipates construction material for its hotel and casino to be shipped directly from China rather than transshipped through Saipan. Supply projections for the hotel and casino development are being prepared for BIG by Windham Hotels. BIG envisages a future market for cruise ship visits direct from Shanghai to Tinian. BIG has also commissioned a study to assess the impact of the proposed ferry operation on coral.

## **CPA Buildings**

BIG is currently constructing four buildings for CPA at the port to accommodate port operations that will be affected by BIG's proposed new development. BIG understands that CPA already has the authority to designate

and establish a Free Trade Zone (FTZ) although it has not yet designated one. 24-hour bonded warehousing in an FTZ would be attractive if / when it is established.

### **1.3.6. Public Information Meeting: 27 October 2016**

The M&N team met with residents and harbor stakeholders on Tinian Island to discuss the current needs and uses at Tinian Harbor. Statements made in that meeting reflect individual opinions and concerns at the time of the meeting. The minutes of this meeting have been combined and summarized by topic in the following paragraphs.

#### **Commercial Harbor Concerns**

Deterioration of the existing finger piers make them an obstruction and not an asset to the harbor. They restrict the maneuverability of bigger ships within the harbor. In addition, deterioration of the existing breakwater has created a risk to public and private property within Tinian Harbor.

Vessel berth times and berth availability limits vessel berthing. Currently, only two ships can be moored at one time. If three ships are in port, one has to remain at anchor. Furthermore, the lack of fire hydrants and firefighting capability at the harbor restricts operations and increases the time at berth for tankers and other hazardous cargo carriers.

The presence of unexploded ordnance (UXO) from World War II is a concern for future harbor development. UXO has been found off Berth 1 of the North Quay and private consultant, AMPRO, was said to have conducted the most recent UXO retrieval operation at the harbor. It was recommended that the Office of Economic Adjustment (Gary Kuwabara) be contacted since annual grants are available for the adjustments of impacts due to military activities. It was also recommended that Derek Chow of the Corps be contacted regarding UXO in the harbor. Brownfield grants were said to be available to fund the identification and removal of UXO.

#### **Public Access and Small Boat Facilities**

A request was voiced to consider an access point or opening in the northwest side of the existing breakwater to allow free flow of small vessels to the marina even during commercial or military operations at the main quay. Widening or improving the inner harbor may also impact small vessel operations.

Fishing area and access is needed for seasonal fish like mackerel (Atulai), as well as public fish cleaning and washing areas. Picnic areas with barbecue facilities, tables and benches are needed as well as improved public parking. The marina also needs improved floats and slips, an upland boat washing area, and fish handling facilities such as a hoist and scale.

The CPA confirmed that boat owners may conduct their own stevedoring at the marina without using the main dock. However, all hazardous materials and products from outside the CNMI must be offloaded at the North Quay by the commercial stevedore. It is estimated that 80% of local commodities arrive through the small boat marina from Saipan. The other 20% of goods come through the main (commercial) dock, usually hazardous materials and products from outside CNMI.

#### **Other Suggestions, Requests and Recommendations**

The master plan should consider the future sewage treatment plant that is being planned for Tinian. It may require a sewage pipe run through the harbor to outfall offshore.

The Master Plan should consider the Environmental Impact Statements that have been prepared for Tinian related to the proposed military activities. BIG offered to share photos of arrival/demobilization of military cargo ships of the previous military exercise and training operations. All military equipment for training moved through the port and military operations occupy the commercial berths for extended periods of time. Military cargo information should be available from the Port of Saipan.

Consideration should be given to a fuel dispensing facility close to the marina. If the current fuel farm needs to be relocated due to the proposed Titanic Hotel, consider relocating it closer to the marina. It was recommended that if the incinerator is rebuilt at the harbor, its location in relation to the proposed Titanic Hotel also needs to be considered.

### **1.3.7. CPA Master Plans Coordination Meeting: 28 October 2016**

The M&N team met with the CPA to discuss the site visit findings and coordination between the Rota, Tinian and Saipan Harbor master plans. Statements made in that meeting reflect goals and schedules at the time of the meeting. The minutes of this meeting have been combined and summarized by topic in the following paragraphs.

#### **Saipan Harbor Master Plan**

GHD is in the process of collecting and reviewing data that will feed into its cargo and passenger forecasts. Initial cargo and passenger projections will be available in November 2016. The Saipan Master Plan will consider existing port operations, anticipated growth of the tourism sector, Saipan's new hotels and casinos, a possible dedicated cruise terminal for recreational boats and yachts, and Department of Defense cargo transhipped out of Saipan. A bathymetric survey of Saipan harbor will be conducted in December 2016.

#### **Tinian and Rota West Harbor Master Plan**

Master planning process for Tinian and Rota West Harbor have been initiated. M&N has begun gathering and reviewing existing records, data, drawings, reports, studies, etc. from CPA. Information gathering meetings with CPA and harbor stakeholders were conducted over the week of 24 October 2016. A Public Information meeting on Rota and Tinian were held on October 26 and 27, 2016.

A bathymetric survey of Rota West Harbor and Tinian Harbor will be conducted in late November or early December 2016.

For Rota West Harbor, the wave and current conditions in the harbor are primary issues of concern. For Tinian Harbor, the proposed new hotels and casinos will bring a significant volume of construction cargo to the island in the near term and the port will need to accommodate supply cargo and ferry service from Saipan for the new facilities.

CPA encouraged the exchange of information between M&N and GHD as the master plan projects progress. The firms will distribute its respective project schedules. Wendi Prater, CPA Project Manager, asked to be copied on all e-mail correspondence between M&N and GHD.

### **1.3.8. Meeting with Tinian and Rota West Harbor Commercial Users: 28 October 2016**

The M&N team met with stevedores, vessel operators, and shippers to discuss the current status of operations at Tinian and Rota Harbors as well as shipping between Guam, Rota, Tinian and Saipan. Statements made in that



meeting reflect commercial user's opinion and plans at the time of the meeting. The minutes of this meeting have been combined and summarized by topic in the following paragraphs.

### **Tinian Harbor Operations**

Presently, not all calling vessels can arrive fully loaded as current water depth limits their draft. A harbor dredge depth greater than 30 feet would improve vessel calls. The U.S. Army Corps of Engineers performed the most recent maintenance dredging of the channel and harbor.

Typically, when a barge or container vessel arrives at Tinian Harbor the stevedore offloads containers using their 120 ton Tadano crane. The containers are offloaded directly to a chassis and delivered inland without storage on the terminal. A typical load currently consists of two 40-foot containers but a typical load when the Dynasty Hotel & Casino was operating was three to four 40-foot containers.

Presently there are two 40-foot chassis available on-island. If more than two containers are received in one shipment, they can be staged on the wharf and drayed inland later. Empty returns are delivered by chassis and either loaded directly before the fulls are offloaded, or prestaged on the wharf and loaded later. Break bulk cargo is also common and can be loaded directly to the customer's truck or can be stored for a short time on the wharf until the customer can receive it. For comparison, approximately 11 dedicated ships have called at Saipan Harbor to deliver construction material for the new Saipan hotel and casino that is under construction.

### **Harbor Regulations**

The U.S. Coast Guard (USCG) mandates that all potentially hazardous cargo be offloaded at the commercial port and not at the small boat marina. Currently, importing non-hazardous cargo is allowed through the small boat marina but it is not regulated nor inspected and no wharfage, dockage or stevedoring fees are collected on the imported cargo. A Facilities Security Plan is currently being prepared at the request of the USCG. This plan is necessary to accommodate the arrival of ferry passengers and vehicles at a commercial cargo port.

### **Tinian Harbor Berthing**

Pacific Marine Enterprises Inc.'s vessel *Pacific Marine I* currently moors along the west side of the Connecting Pier (West Quay). GPPC's<sup>4</sup> *M/V Jayden* currently moors along North Quay Berth 1. The Ro-Ro integrated tug-barge (ITB) *Thunder & Lightning*, and the 500 foot *Ocean Freedom*, a geared general cargo vessel, were chartered by the Department of Defense, Military Sealift Command (MSC) and are the largest vessels to recently call the port.

The master plan needs to consider future mooring of the Mobil Tanker. An underground fuel pipe line runs from the manifold along North Quay Berth 2 to the upland fuel tanks making it the only berth capable of receiving fuel. The way that berth is designed, mooring lines rub against the existing concrete barriers set between the bollards and the wharf. It was stated that the barriers were placed per USCG regulations.

### **Tinian Wharf Conditions**

Wharf lighting is currently inoperable. Harbor users requested that the inoperable lights be investigated and addressed as a high priority operational need. If wharf lighting was available during the recent Department of Defense cargo offloading operation, the cargo could have been offloaded during non-daylight hours and

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<sup>4</sup> GPPC Inc., Construction Company

completed much more efficiently. It was stated that it is suspected that the electrical wiring had been removed from the existing light towers by thieves. Additional needs include firefighting capability at the wharf. Currently when tankers offload fuel, an airport fire truck is called upon to standby at the seaport. The ability to provide water-bunkers would also be beneficial and water could be sold to visiting vessels.

## **Ferry Service**

If ferry service is to be considered between Saipan and Tinian or Rota, a viable port of call on Saipan needs to be identified. The prior ferry services had been operated from Charlie Dock on Saipan. The Port of Saipan's commercial terminal does not seem to have available berth nor wharf space to accommodate an interisland ferry service. It was noted that David Dougherty has leased a parcel of land adjacent to the Port of Saipan where a ferry dock could be built. It was suggested that the companies proposing the ferry service reach out to Mr. Dougherty.

### **1.3.9. CPA Out-Brief Meeting: 28 October 2016**

The Consultant team met with the CPA to brief them on the site visit findings and data collection for the Rota and Tinian Harbor master plans. Statements made in that meeting reflect goals and schedules at the time of the meeting. The minutes of this meeting have been combined and summarized by topic in the following paragraphs.

## **Regulations**

The team discussed the Coast Guard mandate that all potentially hazardous cargo be offloaded at the commercial port and not be offloaded at the small boat marina just northwest of the commercial port. Currently, non-hazardous cargo is allowed through the small boat marina but it is not regulated nor inspected and no wharfage, dockage or stevedoring fees are collected on the imported cargo. M&N asked if this policy will be continued into the future; CPA will get back to M&N.

The U.S. Transportation Security Administration (TSA) and U.S. Customs and Border Protection (CBP) do not currently maintain a presence in either Tinian Harbor or Rota West Harbor.

## **Military**

Since the U.S. military holds "lease back" on approximately two-thirds of the island of Tinian, the U.S. military's authority as it relates to the harbor operations and future master plan for the Tinian Harbor is unclear (i.e., does the U.S. military have the authority to review, change, direct the master plan; does the U.S. military have the authority to control the day-to-day operations of the port and direct how berths and wharf / yard space is assigned; etc.). CPA will get back to the Consultant with clarification.

## **Forecast**

The Consultant requested air passenger arrival logs for the past few years, including the time when the Tinian Dynasty Hotel & Casino was operating and after it closed. The Consultant would like to try to correlate and approximate cargo volumes to the island due to the hotel.

## **Conditions**

Harbor users reported that the wharf lighting is currently inoperable. Harbor users requested that the inoperable lights be investigated and addressed as a high priority operational need. It was stated that it is suspected that the wiring had been removed from the existing lights by thieves.

### **1.3.10. Second Public Information and Stakeholder Meetings**

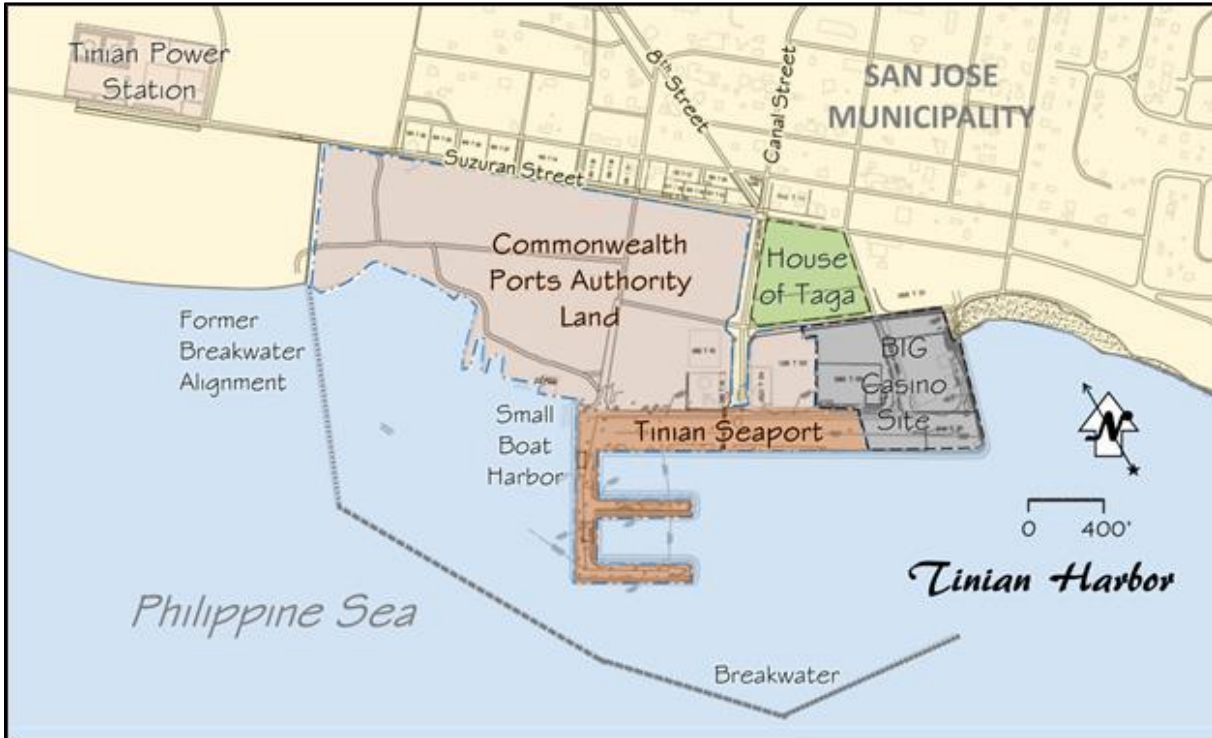
A second set of meetings were held in March 2018 to present the draft Tinian Harbor Master Plan to the public and other stakeholder groups and to receive feedback on the Master Plan draft. No substantive comments affecting the draft Master Plan were received during the March 2018 meetings. Notes from those meetings can be found in the *Notes of Meeting* provided in Appendix D.

## 2.0 Existing Physical Conditions

### 2.1. General Site Configuration

The Tinian commercial seaport is buffered from the adjoining San Jose Municipality by about 40 acres (16ha) of undeveloped Commonwealth Ports Authority land. Construction of the BIG casino on the eastern side of the port creates a “hard edge” to the commercial port activities, as does the House of Taga historical and cultural park adjacent to the casino. Commonwealth Ports Authority land is bounded on the north by Suzuran Street which represents the edge of residential land uses in San Jose.

Figure 2-1: Tinian Seaport Locale



A 3,500-foot breakwater protects the harbor from wave action from the south and the southwest. Although this breakwater once extended another 1,100 feet to connect with the land at the north end of the harbor, that structure has been destroyed by corrosion and natural processes.

The Tinian Seaport itself consists of two finger piers and approximately 1,400 feet of contiguous quay wall. The portions of waterfront within the BIG casino area are not considered part of the seaport for this Master Plan. Figure 2-1 above illustrates the location of the Tinian Seaport relative to the BIG Casino development, the House of Taga historical site, and the CPA backlands. Of these sites, only the Seaport operational area and the vacant Ports Authority lands offer master plan development opportunities.

Figure 2-2: Commercial Port Configuration

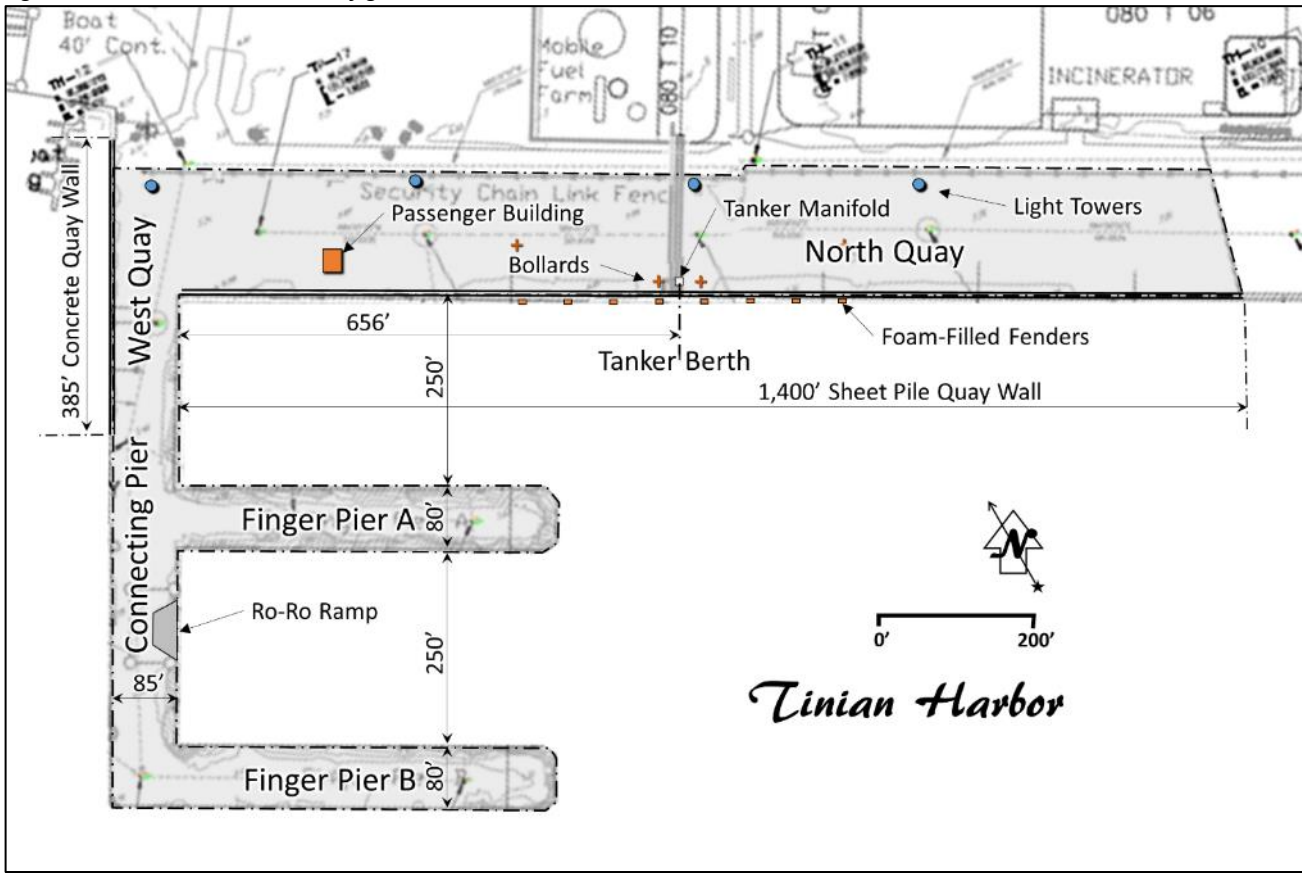


Figure 2-2 illustrates the existing commercial seaport in more detail. Dimensions of the Finger Piers and Connecting Pier shown in the figure are as originally designed. However, significant deterioration and collapse of the sheet pile walls has reduced the width and created an irregular water line.

## 2.2. General Quay Wall Conditions<sup>5</sup>

Based on a 2015 underwater survey conducted by M&N, the steel sheet pile wall at North Quay Berths 1, 2, and 3 shows corrosion losses that are estimated to be 20% to 25% of the steel thickness. Section loss was most prevalent in the top six feet of the wall, but no holes were observed during the inspection. There is no coating or cathodic protection evident on any of the Tinian Harbor steel sheet pile quay walls and corrosion damage can be expected to continue if a cathodic system is not installed. North Quay Berth 2 has recently undergone a series of improvements including new fender system, concrete cap repairs, and new mooring bollards.

During an October 2016 site visit, two of the fenders appeared to have broken loose at Berth 2. Berths 1 and 3 do not appear to have undergone any recent improvements, and isolated areas of concrete cracking and spalling were observed in the concrete cap.

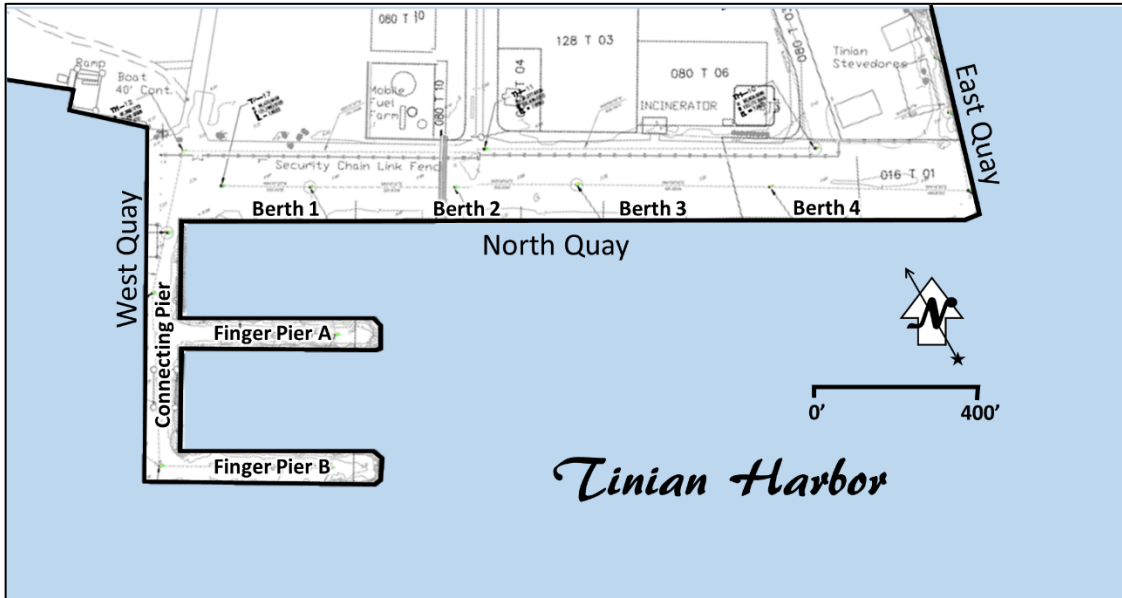
North Quay Berth 4, shown in Figure 2-3 below, is not currently in service for mooring and berthing operations. What appears to be a concrete pile cap is actually a large concrete curb. In places, the sheet pile has detached

<sup>5</sup> A complete condition assessment of the quay wall and berthing facilities is included in Appendix A; *Assessment of Tinian Harbor*, prepared by Moffatt & Nichol May 2015

from the curb and the tops of the steel sheet piles terminate near the waterline. Widespread holes in the wall were observed along all of Berth 4.

The East Quay, adjoining Berth 4 also shows widespread failures of the steel sheet pile. In some places, the top portion of the steel sheet pile wall had displaced in excess of 10 feet from the deck, limiting the surface load capacity. The East Quay and Berth 4 are a part of the BIG Casino and not the maintenance responsibility of CPA.

Figure 2-3: General Quay Wall Layout



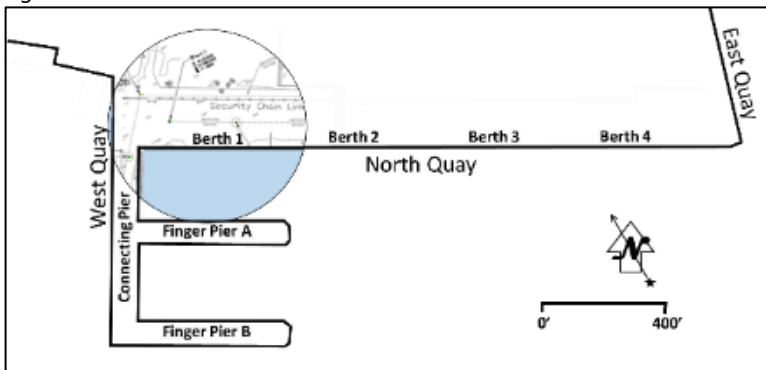
The West Quay, located 385 feet along the northwest portion of the Connecting Pier, has recently been repaired and the mooring hardware has been replaced. The wall in this area is in similar condition as Berths 1, 2, and 3 of the North Quay with corrosion losses of 20-25%.

Finger Piers A and B are no longer in use for berthing or cargo handling. A small Ro-Ro ramp has been constructed on the Connecting Pier, south of Finger Pier A. This ramp is occasionally used to offload construction equipment. All of these finger pier structures have outlived their design service lives.

## 2.3. Harbor and Berthing

### 2.3.1. North Quay Berth 1

Figure 2-4: Berth 1



Berth 1 was previously used as the Tinian Ferry terminal. The passenger building is being demolished and a lack of quay wall fendering makes it undesirable for cargo transfer. On the west end of Berth 1, the deteriorated sheet pile bulkhead has allowed backfill material to spill into the berth area.

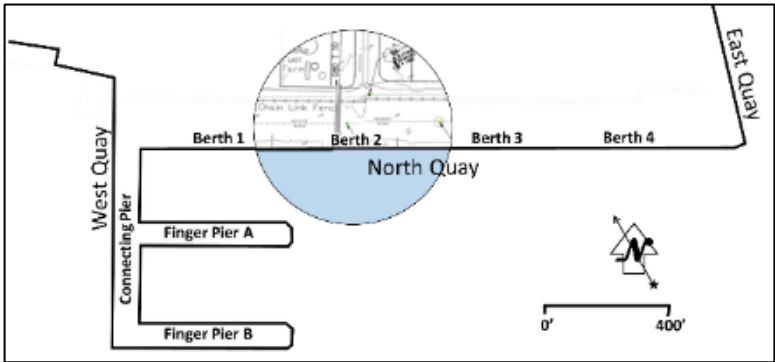
Figure 2-5: Berth 1 from the Water



Source: M&N, 2016

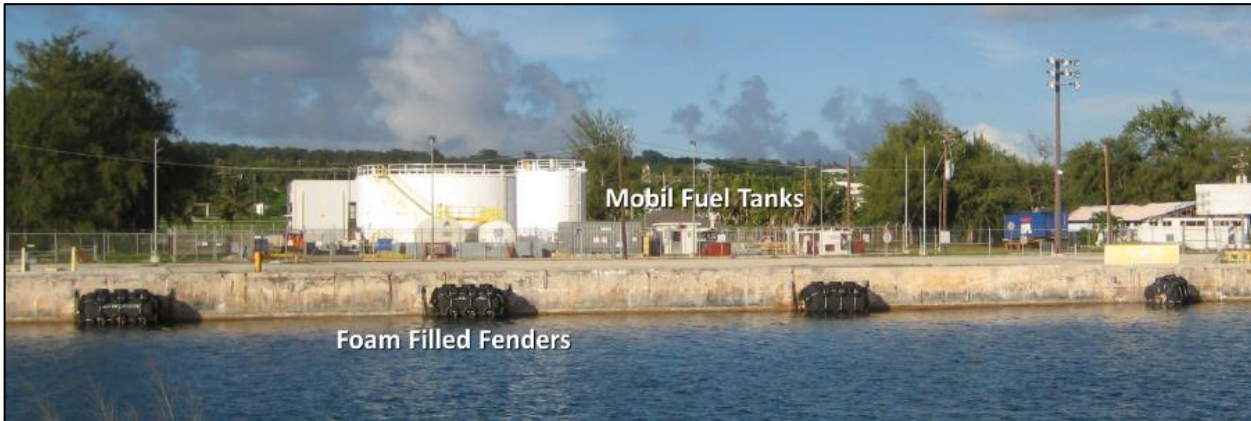
### 2.3.2. North Quay Berth 2

Figure 2-6: Berth 2



Berth 2 is the primary cargo berth on Tinian with improved fenders and mooring bollards. It accepts container barge traffic, Mobil tankers, small cargo vessels and military sealift ships. A riser with underground pipeline connects Berth 2 with the Mobil fuel tanks located nearby. As all of Tinian's energy needs derive from fuel delivered at Berth 2, any conflict between tanker arrivals and cargo uses generally results in delays or missed vessel calls.

Figure 2-7: Berth 2 from the Water



Source: M&N, 2016

Berth 2 is heavily utilized, mostly because it has effective fendering, has reasonable depth, and is more protected than Berth 3. This can lead to congestion when a cargo vessel is in port and a tanker needs to discharge at Berth 2. The fenders at Berth 2 show premature wear and damage to the chain anchor mounts due to the installed configuration and possibly due to vessel strikes. Tinian does not have tug service at the harbor and when larger vessels call, a tug must be brought in from Saipan (estimated 2.5-hour trip).

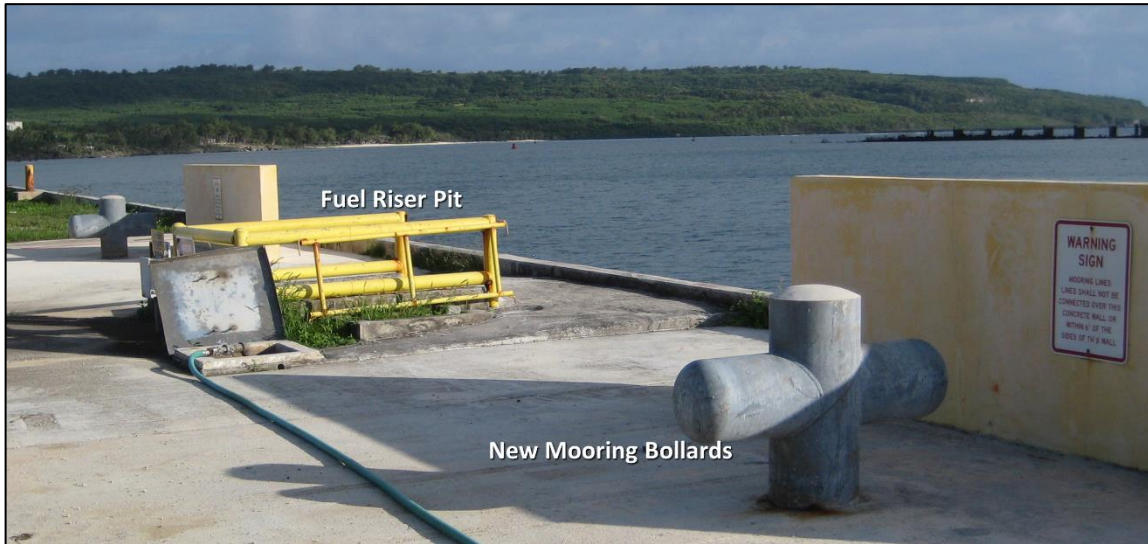
Figure 2-8: Damaged Fender



Source: M&N, 2016



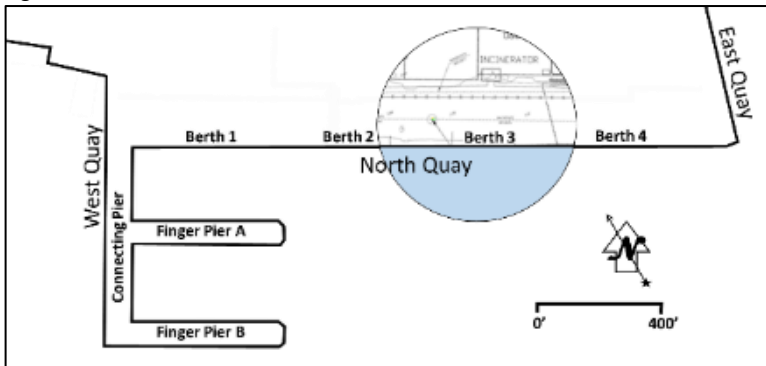
Figure 2-9: Berth 2 Tanker Cargo Hose Riser Area



Source: M&N, 2016

### 2.3.3. North Quay Berth 3

Figure 2-10: Berth 3



Tinian Harbor Berth 3 is more exposed to wave action entering from the channel than Berths 1 and 2. It is often used for container barge offloading when Berth 2 is occupied by a tanker or other vessel. Berth 3 has also been used for Ro-Ro cargo offloading by visiting military sealift vessels. As these ships lack side-ramps, they must turn perpendicular to the berth in order to offload. This configuration blocks Berth 1 and Berth 2 from vessel movement for as long as the Ro-Ro operation takes place. Like Berth 1, Berth 3 no longer has adequate fendering for safe vessel mooring.

The exposed sections of the steel sheet pile bulkhead of Berth 3 were observed to be severely deteriorated prior to 2006 (see Figure 2-13). A concrete cap was applied to the top of the sheet pile bulkhead but it has also sustained damage in spot locations and should be repaired (see Figure 2-12).

East of Berth 3, Berth 4 has been leased to Bridge Investment Group (BIG) that is developing a hotel and casino complex. As this is a long-term lease, Berth 4 is not considered as part of the Tinian Harbor Master Plan, except as it relates to other uses.

Figure 2-11: Berth 3 from the Water



M&N, 2016

Figure 2-12: Berth 3 from the Land



M&N, 2016

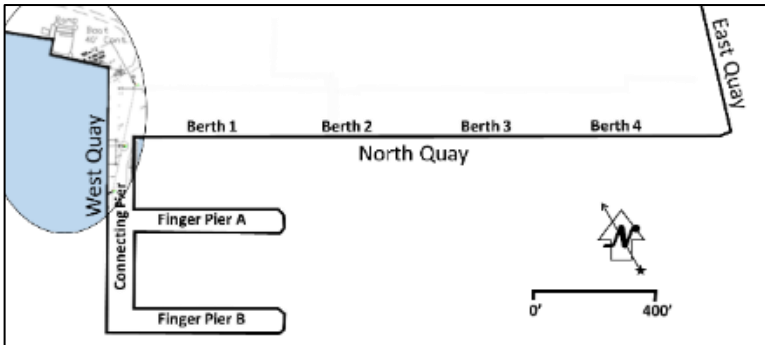
Figure 2-13: Berth 3 Prior to Repair (2006)



Source Unknown, pre-2006

### 2.3.4. West Quay

Figure 2-14: West Quay



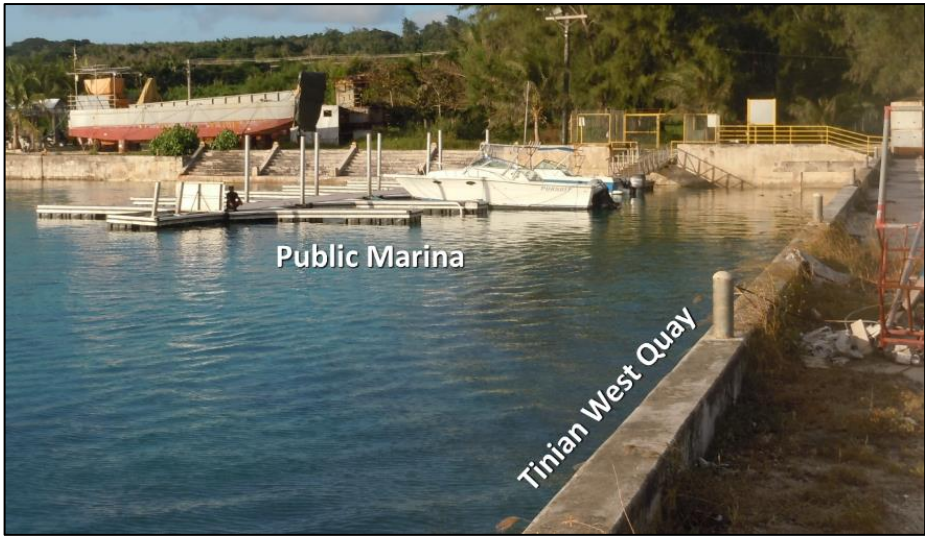
The West Quay is a 384-foot concrete quay wall with improved mooring bollards but little or no fendering. This berthing area is mostly used by smaller commercial vessels and barges. Access to the West Quay is by a natural channel around the south of Finger Pier B. However, water depth at the quay varies from six feet to less than three feet. Therefore, use of the West Quay is limited to shallow-draft vessels.

Figure 2-15: Tinian West Quay from the Water



M&N, 2016

Figure 2-16: Tinian West Quay from the Land



M&N, 2016

### 2.3.5. Port Operations Area

The primary operations area for the commercial seaport is a strip of paved land approximately 160 feet wide and 1,465 feet long located directly behind the North Quay. The paving is in fair condition and the terminal operator, Saipan Stevedore Company, Inc., states that it has sufficient load bearing capacity to support their crane outriggers anywhere on the terminal. However, evaluation of the quay wall indicates that it could be overloaded at 250 psf.

Figure 2-17: North Quay Operations Area Features

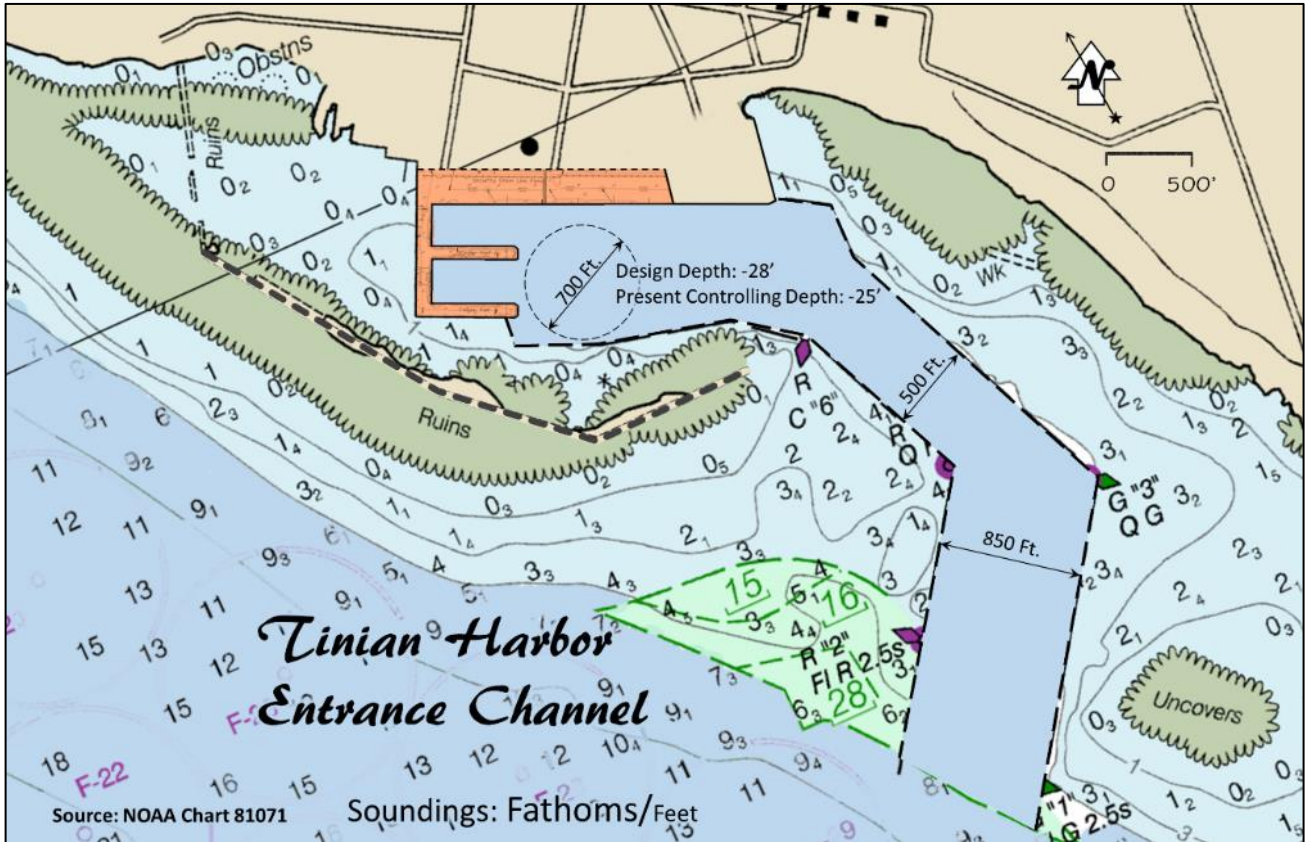


Source: M&N, 2016

### 2.3.6. Channel and Turning Basin

The Tinian Harbor entrance channel extends northward through a break in the fringing reef for a travel distance of about two thirds of a mile to the inner harbor. The outer channel has a design width of 850 feet that narrows to 500 feet after a 60-degree bend to the northwest as illustrated in Figure 2-18. The berthing area has a maximum width of about 750 feet at the 25-foot controlling depth<sup>6</sup>. A 700-foot turning circle is possible at Berth 3. However, vessels at berth could reduce its effective diameter.

Figure 2-18: Tinian Harbor Channel Geometry and Breakwater



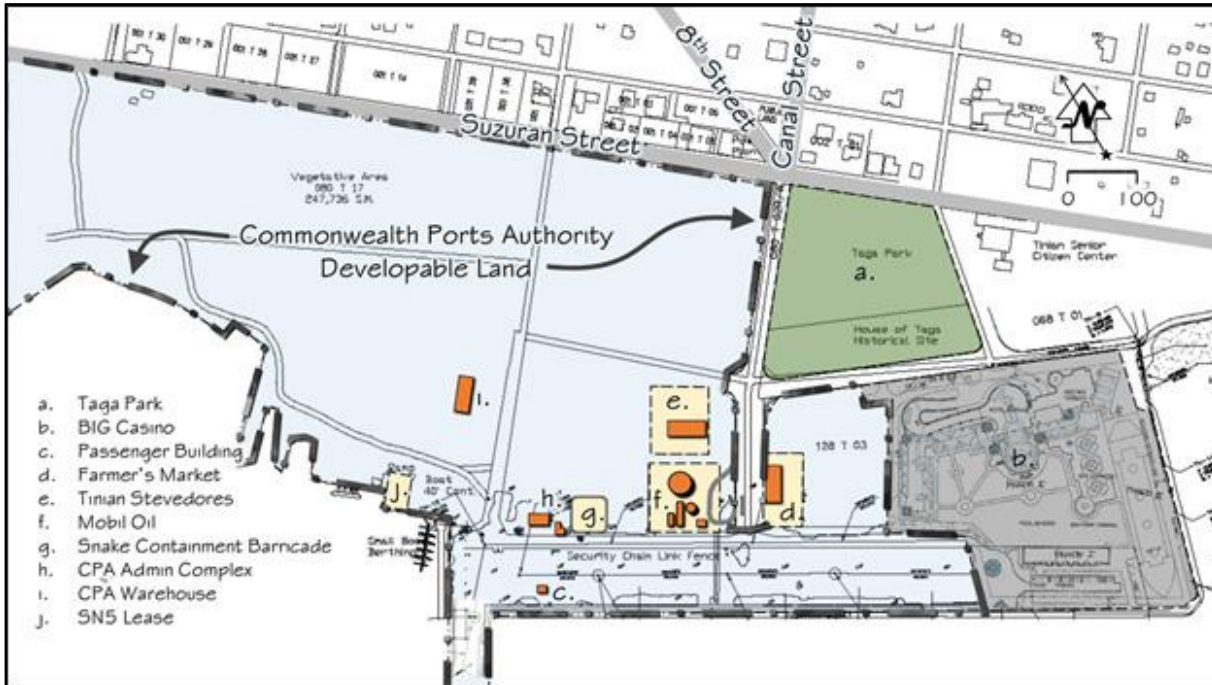
### 2.3.7. CPA Property and Upland Uses

Commonwealth Ports Authority controls approximately 73 acres of “fast land” including the wharf and finger pier areas, the breakwater, and all leased areas between Suzuran Street and the marine terminal, not including the House of Taga cultural site.

Excluding the BIG Casino leased area and smaller parcels leased to Mobil, Saipan Stevedore Company, Inc., and other enterprises, CPA controls about 57 acres of wharf and backlands. Of that, approximately 45 acres remain for future development. Figure 2-19 illustrates the location of the developable land and the various CPA Tinian Harbor upland features.

<sup>6</sup> All depths refer to Mean Lower Low Water datum

Figure 2-19: Port Authority Upland Features



Taga Park (Item a.) and the BIG Casino lease site (Item b.) form the east boundary of the port. The North Quay Berth 1 through Berth 3 bound the property to the south. An on-dock passenger building (Item c.) is being demolished. The other site features include:

- Item d. – An active public Farmer’s Market
- Item e. – A new warehouse for the terminal operator
- Item f. – The island’s fuel storage and distribution facility (connected to Berth 2 and leased to Mobil Distributing)
- Item g. – A new confinement area for brown tree snake sequestration
- Item h. – A new (under construction) CPA office and operations building
- Item i. – A new (under construction) CPA equipment warehouse
- Item j. – A leased property for commercial fish landing

Although the development is clustered around the marine terminal, most of the backlands remain vacant. Suzuran Street borders the CPA property on the north and serves as a separation between the Municipality of San Jose and the port. Fuel oil for island power generation is trucked about ¾ mile from the Mobil facility to the generator site along Suzuran Street.

Canal Street runs perpendicular to Suzuran and provides direct access to the marine terminal. It also connects the seaport with the airport facility about three miles north by road. West of Canal Street, an unnamed road (herein designated *West Access Road*) connects Suzuran Street directly to the west end of the marine terminal and provides access to the adjacent public marina.

### 2.3.8. Public Access and Small Boat Facilities

At the west end of the Commercial Port, approximately two acres have been developed as a public access area. Amenities include a public boat launch ramp, a picnic shelter and parking, and a public marina. The public access

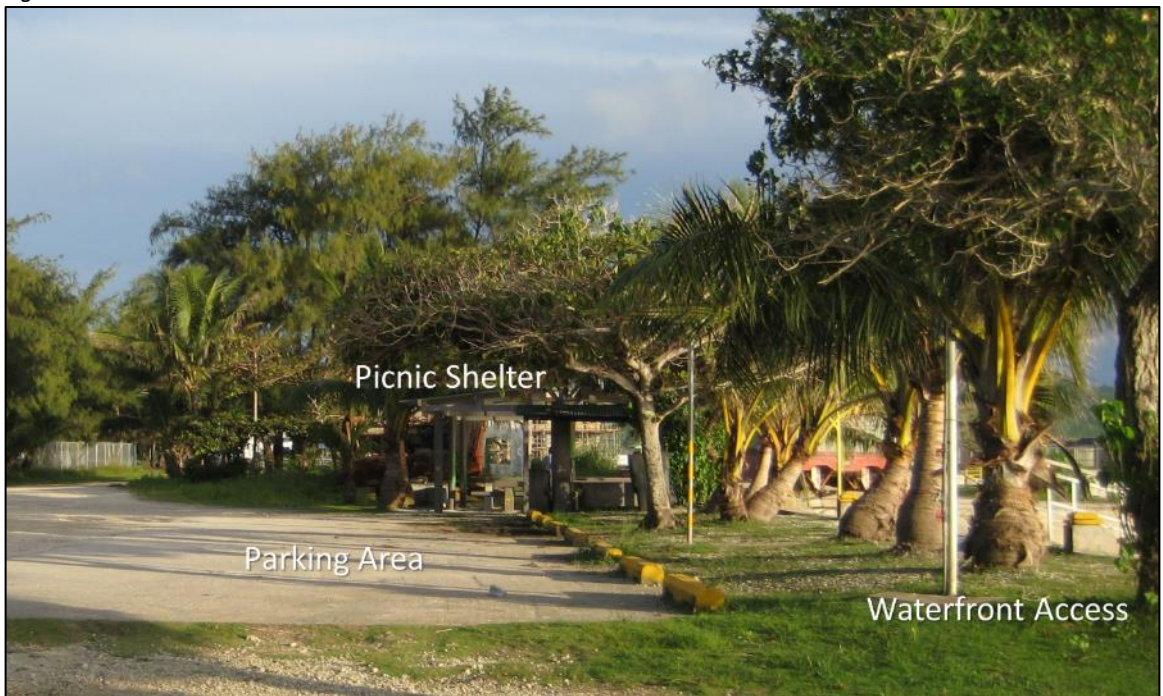
area also includes a Ro-Ro ramp for small landing craft type vessels and a commercial lease for fish landing and processing. There are no public toilet facilities at the marina or public access area.

Figure 2-20: Existing Public Access Area



Figure 2-20 illustrates public access to the water at the CPA property. Public access is also provided east of the port at Kammer Beach. However, this area is not part of CPA jurisdiction and will be separated from the port by the new casino development.

Figure 2-21: Tinian Harbor Public Amenities



Source: M&N, 2016



Two small boat dock facilities have been constructed at the CPA public access area. Adjacent to the West Quay is an eighteen-berth marina with slips for vessels up to 20 feet in length. This marina was constructed about 2005 and shows considerable wear. Deck boards are missing in many places and the cleats and fendering are damaged. Some of this wear can be attributed to wave action entering the harbor from the northwest, but use of the slips by oversized vessels (>25 feet length) can also cause accelerated deterioration. Figure 2-22 illustrates some of the damage seen at the small boat marina.

Figure 2-22: Tinian Small Boat Marina Damage



Source: M&N, 2016

The Tinian Harbor public access area is also provided with an 85-foot small boat landing that is often used to ferry consumer goods from Saipan. It also functions as a temporary mooring for the adjacent launch ramp. This landing is a heavily constructed floating dock supported by “stiff arms” that are attached to the shore abutment.

Figure 2-23: Small Boat Landing



Source: M&N, 2016

## 2.4. Navigation, Dredging, and Breakwater Conditions

### 2.4.1. Navigation

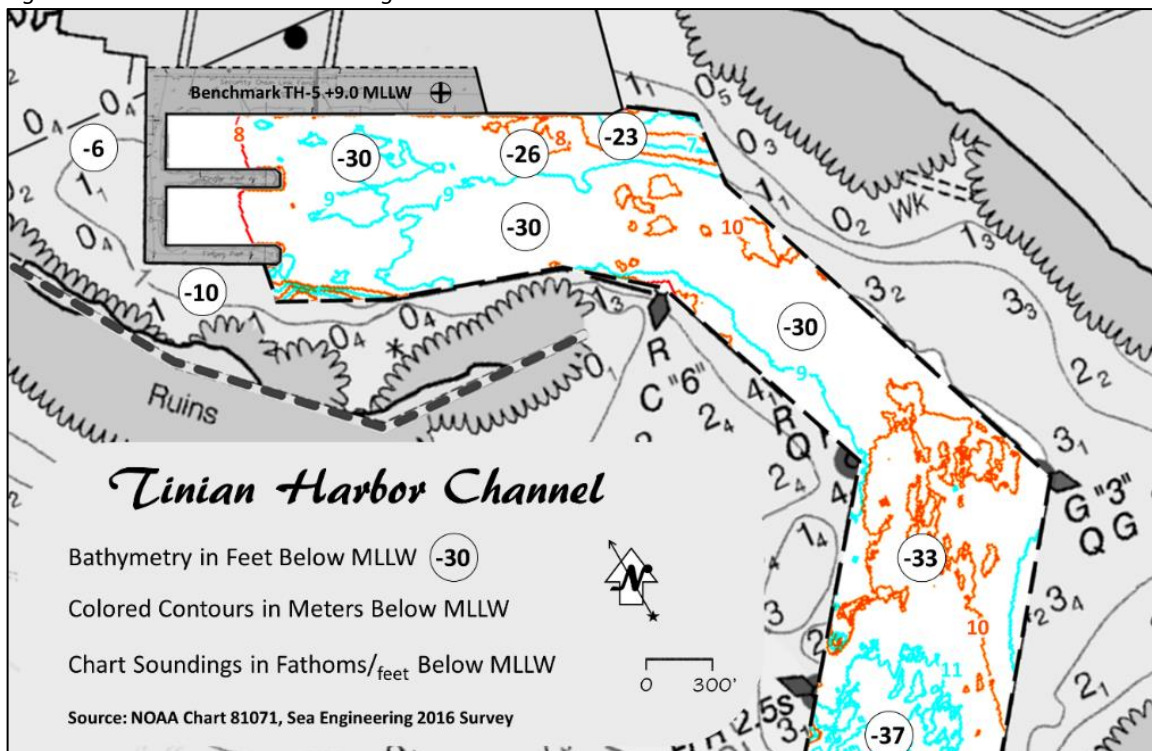
Four navigation buoys mark the outer channel entrance to Tinian Harbor. At this location, the channel is 850 feet wide and over 30 feet deep. From the entrance, the channel proceeds about 1,700 feet to the northeast where it turns approximately 60 degrees to the north-northwest and narrows to 500 feet. The harbor entrance is marked with a fixed light at the east end of the North Quay. The channel markers appear to be in good condition. However, there are no range markers on the shore.

### 2.4.2. Dredging

In December of 2016 a multi-beam sonar bathymetric survey was performed at Tinian Harbor. The raw data was adjusted to Mean Lower Low Water (MLLW) by reference to benchmark TH-5 with a nominal elevation of +9.0 feet above MLLW. For this report, all soundings reference that datum elevation. The results of this survey were compared with a 2007 National Oceanic and Atmospheric Administration (NOAA) survey of the basin. In particular, shoaling that was identified in 2007 is also documented in the 2016 survey.

For areas outside the entrance channel and commercial port basin, a 2013 LIDAR (Light Imaging, Detection, And Ranging) survey was used, along with navigation chart soundings. These three data sources have been compiled into a single graphic shown in Figure 2-24. In shallow water, the three data sources agree reasonably well. In the deeper areas of the channel and basin, the multi-beam sonar survey is more accurate.

Figure 2-24: Tinian Harbor Soundings



A detailed evaluation of the measured bathymetry and data from 2007 NOAA survey shows that the entrance channel is largely at, or below the design dredge depth of -30 feet MLLW. Some areas of shoaling occur on the

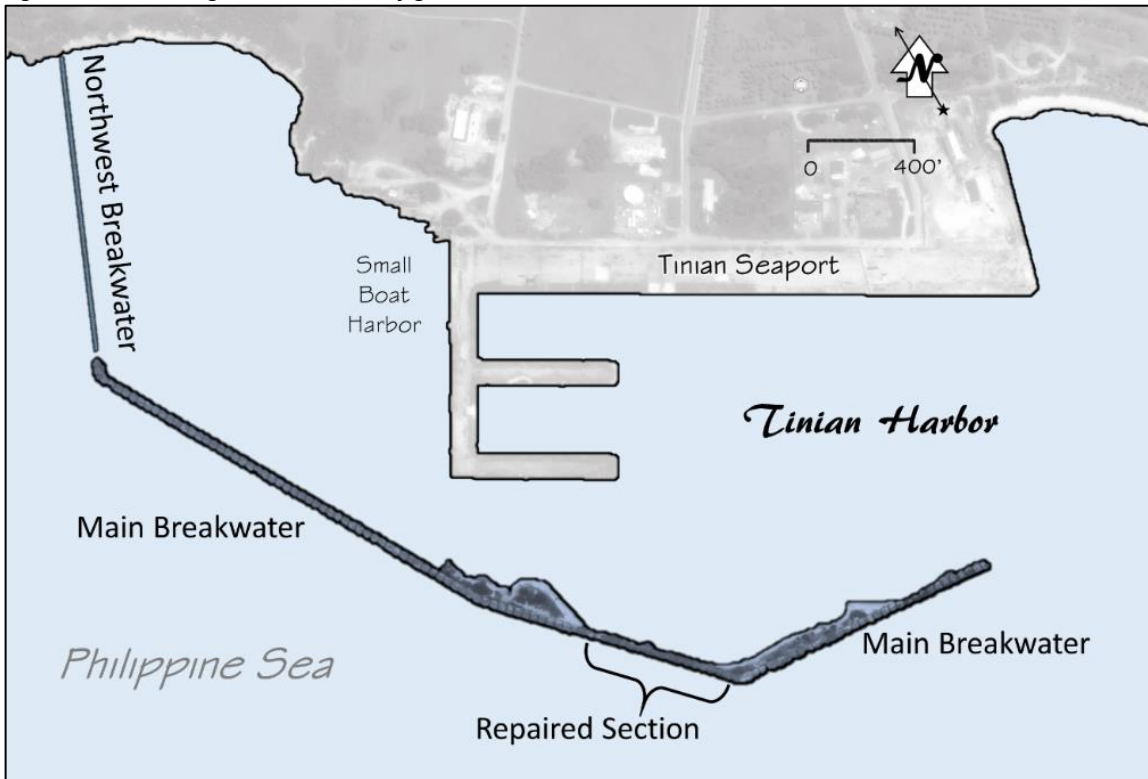
east side of the channel. A 2015 evaluation of the Tinian breakwater<sup>7</sup> was prepared for the U.S. Army Corps of Engineers that compares the present channel depths with earlier measured bathymetry and the 1945 design depth. This report concludes that very little active shoaling takes place in the channel or the basin.

However, along the North Quay, particularly at Berth 3 and Berth 4, there are significant shallow areas along the foot of the quay wall. This shoaling appears to have resulted from backfill that has washed out from behind the deteriorated sheet pile. Since the eastern portion of Berth 3 and all of Berth 4 were reconstructed by FPA Pacific Corporation in 2007, it's likely that that shoaling predated the reconstruction. Shoaling is also noted between the finger piers, where failure of the retaining walls has contributed fill material and debris to the berthing areas.

Discussion with local stakeholders and comparison with 1997 soundings shows that current-driven sediment from the western lagoon area has narrowed the channel between Finger Pier B and the breakwater. It also appears that significant shoaling has taken place along the West Quay and Marina area. It should be noted that caution must be used in comparing bathymetry from various sources, as the elevation difference between MLLW and WGS84 Mariana Island datum can change depending on which tidal stations are referenced.

### 2.4.3. Breakwater

Figure 2-25: Existing Breakwater Configuration



Source: M&N

The existing breakwater was constructed in 1944-1945 on the shallow fringing reef, with a total length of approximately 4,600 feet. Construction is interlocking steel sheet-pile similar to the Tinian Harbor quay walls. Two different structural arrangements were used. Starting from the shore approximately 1,600 feet northwest of the port, a single row of steel sheet piling was driven for a total length of 1,100 feet. This portion is referred to as the Northwest Breakwater. It depended on the cantilever strength of the sheet-pile units and has failed

<sup>7</sup> U.S. Army Corps of Engineers; *Tinian Harbor Condition Assessment and Breakwater Alternatives Evaluation*; July 2015

entirely since its construction. The small boat marina area now relies on the adjacent fringing reef and shallow lagoon to attenuate ocean swells from the west. The Northwest Breakwater no longer offers storm protection to this area or to Tinian Harbor.

Along the fringing reef, the Northwest Breakwater connects to the 3,500-foot-long Main Breakwater. This structure is built up from sheet-pile cells filled with dredged coralline material and capped with concrete. Each circular cell was 30 feet in diameter, and had a crest elevation of +15 feet mean lower low water (MLLW). The steel cells of the Main Breakwater have largely failed due to corrosion and allowed the fill material to scatter on the harbor side of the reef. Approximately 900 feet in the middle of the breakwater was repaired in 1979. However, large sections at both ends of the breakwater no longer extend above the mean tidal elevation.

Both the eastern and the western ends of the Main Breakwater are severely deteriorated, with the last several hundred feet essentially gone. There are large gaps at the water line, and the breakwater remnants provide little wave protection, even during typically prevailing conditions. The Tinian Harbor breakwater is severely deteriorated, and provides limited protection against storm waves. A severe storm is likely to cause significant additional damage to the breakwater, and could transport breakwater remnants and debris into the harbor and surrounding navigable waters.

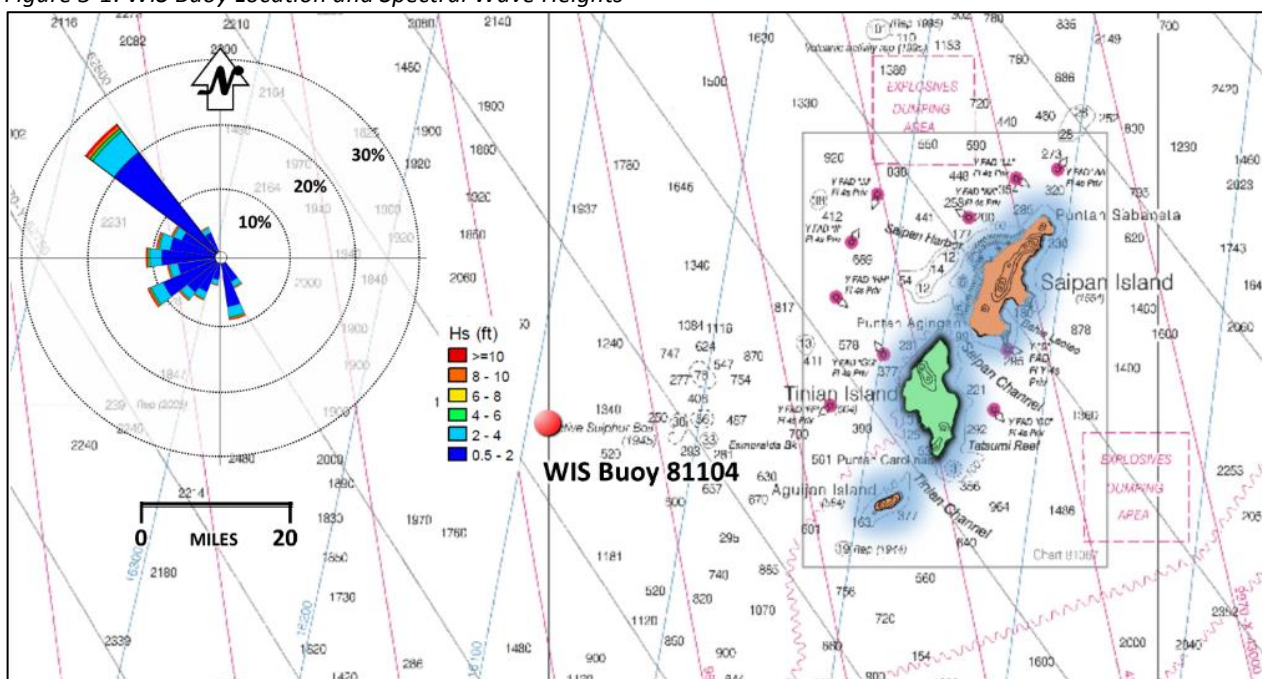
### 3.0 Waves, Weather, and Tectonic Environment

#### 3.1. Offshore Metocean Conditions

An estimate of storm generated winds, waves, currents, and surge is needed to develop design conditions at the channel, breakwater and within the mooring area<sup>8</sup>. At Tinian Harbor, instrumented buoys have acquired data over the past twenty years or so. Such data make it possible to compute extremes directly from the measurements and the reliability of such estimates is related to the proximity and number of recording buoys.

Wave information was acquired from data sets provided by the U.S. Army Corps of Engineers' Wave Information Studies (WIS) and a hindcast method was applied to the specification of probable wave conditions. This method was based on historical buoy data, the time history of the sea state and currents in the area, calculation of the expected extreme wave heights and associated properties, and extrapolation of the calculated extremes.

Figure 3-1: WIS Buoy Location and Spectral Wave Heights



Data Source: Tinian Harbor Condition Assessment and Breakwater Alternatives Evaluation; U.S. Army Corps of Engineers, July 2015

Hourly deepwater wave characteristics from a 32 year period of observations were derived from WIS Station 81104 shown in Figure 3-1. This time series record has been filtered to include only waves from directions that could impact the harbor: 150° to 330°. As this wave rose illustrates, the majority of offshore waves arrive from the northwest. The graphical representation shows that significant offshore wave heights (Hs) from the northwest are less than four feet for about 25 percent of the time. However, waves of eight feet or higher can occur from almost any direction.

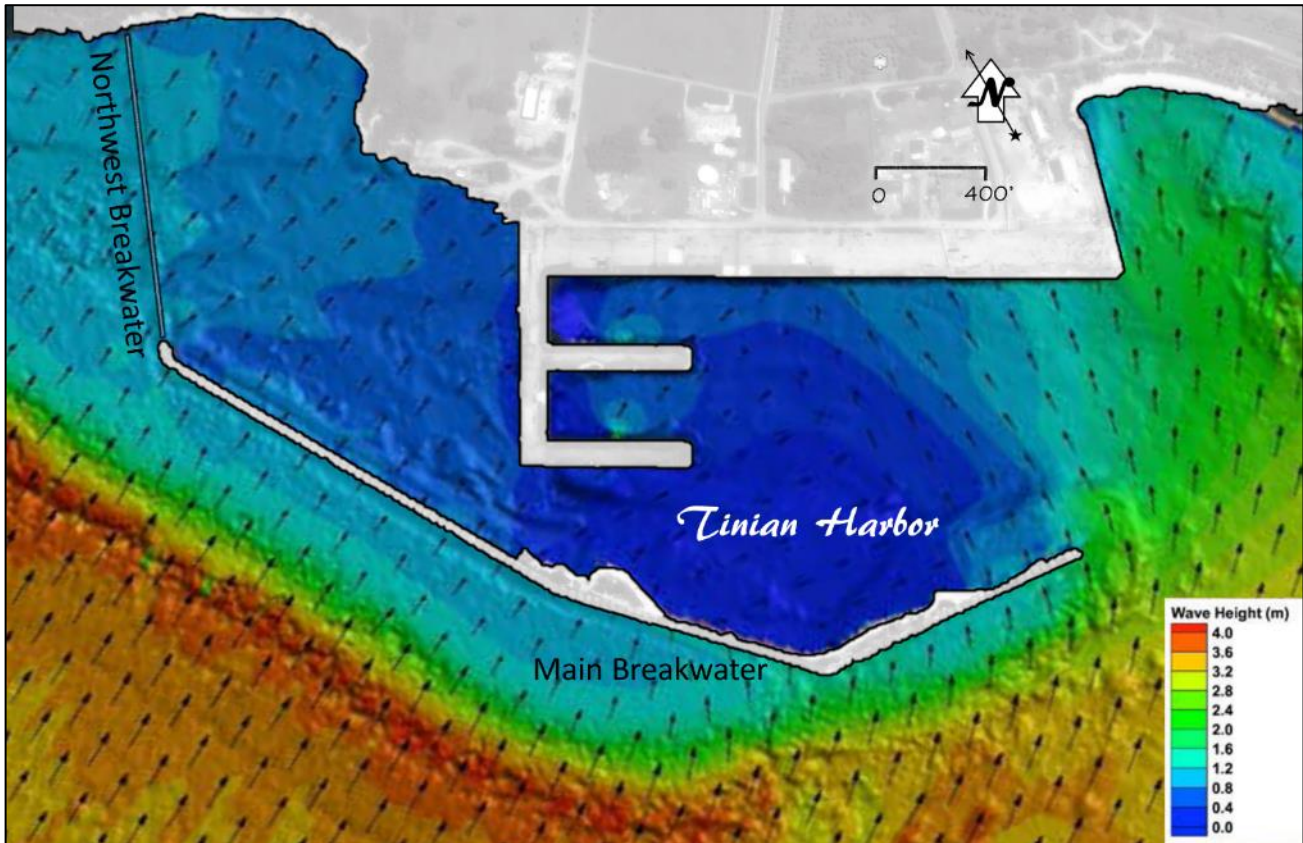
#### 3.2. Nearshore and Harbor Wave Action

As deepwater waves propagate toward shore they begin to encounter shallow water and undergo transformation due to the ocean bottom configuration. A spectral wave model was used to transform the

<sup>8</sup> Wave data and graphics in this section are derived from U.S. Army Corps of Engineers; Tinian Harbor Condition Assessment and Breakwater Alternatives Evaluation; July 2015

deep-water waves from WIS station 81104 to shallower water near Tinian Harbor. The results were then used to drive a nearshore harbor wave and circulation model that included bottom and shore conditions in the vicinity of, and within, the harbor. The model simulates currents, water level, sediment transport, and morphology in the coastal zone.

Figure 3-2: Near Shore Wave Action (Annual Max)



Data Source: Tinian Harbor Condition Assessment and Breakwater Alternatives Evaluation; U.S. Army Corps of Engineers, July 2015

Near shore, bottom conditions reorient normal incident waves that arrive from the west or southwest as shown in Figure 3-2. This graphic illustrates the results of a spectral wave transformation model applied to the average maximum annual wave conditions as predicted by hindcasting of offshore waves. This model demonstrates the effectiveness of the offshore reef structure in attenuating incident waves from 3.2-4.0 meters, down to 0.8-1.6 meters. It also illustrates how diffraction around the end of the Main Breakwater can direct waves of more than 1.0 meter in height to the North Quay Berth 3 and Berth 4.

Increased wave height seen between the Finger Piers and alongside Berth 2 is likely modeled as wave reflection off the North Quay. Wave monitoring within the harbor, and additional modeling will be required to calibrate the detailed internal wave distributions. The low-sun-angle satellite image shown in Figure 3-3 illustrates the effect of wave diffraction into Tinian Harbor, and the corresponding internal reflections that take place when these waves strike the North Quay.

Figure 3-3: Internal Harbor Waves

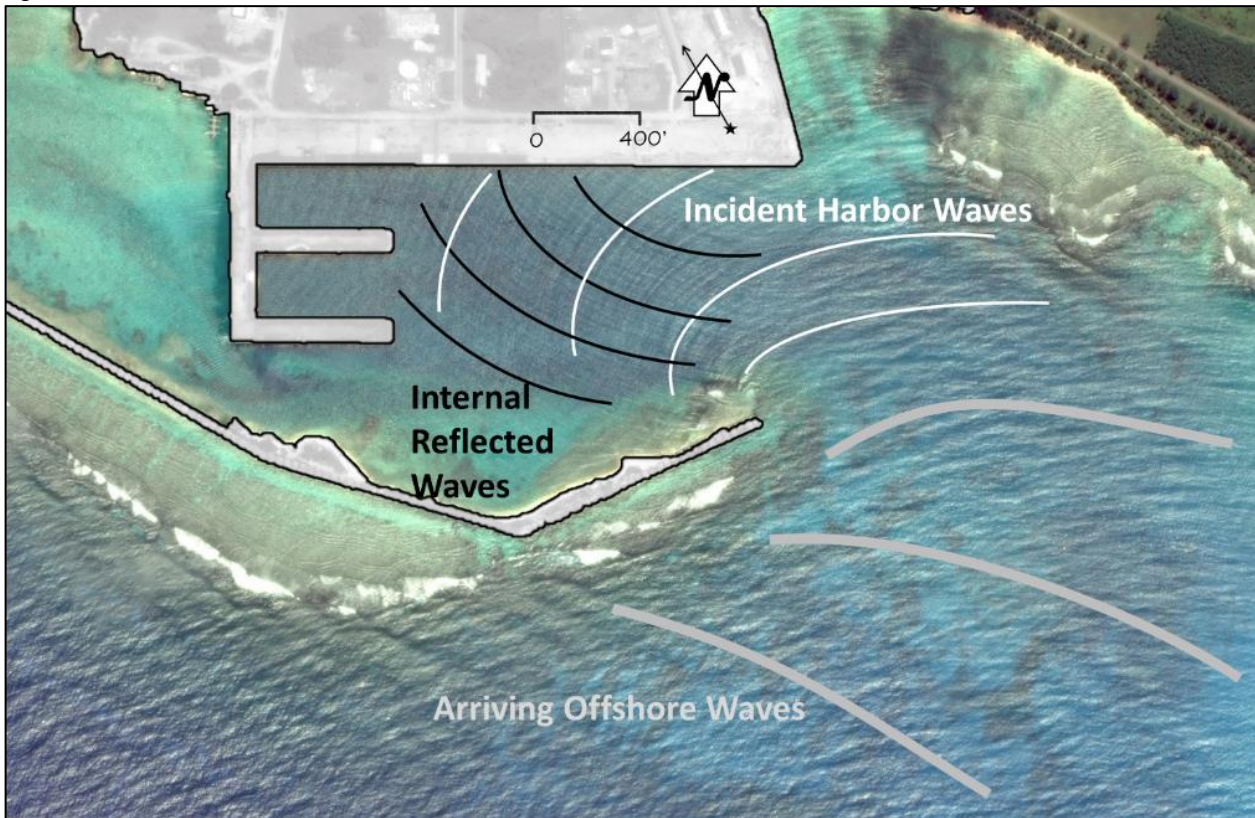


Image Source: Google Earth, Digital Globe 2012 Satellite Image

### 3.3. Climate, Tidal Elevations, and Cyclonic Storms

#### 3.3.1. Normal Climate Variations

The Northern Mariana Islands have a tropical marine climate moderated by seasonal northeast trade winds from November to March and easterly winds from May to October. Average year-round temperature is 84° F with an average humidity of 79%. The seasonal variation in mean monthly temperature is less than 3.5 degrees F. The dry season runs from December to June, and the rainy season from July to November. The mean annual rainfall is approximately 83.8 inches, but rainfall varies from year to year. At times, the islands experience droughts generally during the period from December through June.

The annual mean cloudiness in the Marianas averages 6.7 on a scale of 0 for a cloudless sky, to 10 representing a completely overcast sky. Cloudiness is greatest from July to September with an average of 19 cloudy days per month. The Marianas experience three wind patterns. These are: trade winds, doldrums and typhoons. The islands lie near the border between the Asiatic monsoon and the belt of northeast trade-winds. Easterly winds prevail about 45 percent of the time at an average annual wind velocity of 10.5 mph. Light thunderstorms occur occasionally throughout the year, particularly during the months of June to October.

The oceanic and atmospheric event known as “El Nino” can change weather patterns within the Pacific and along its eastern coastlines in both the Northern and Southern Hemispheres. It is related to a reversal of the equatorial undercurrent in the western Pacific. This equatorial undercurrent is about 275 miles wide and extends across the Pacific flowing eastward at the equator at about one mile per hour, however, at times it has been measured flowing in the opposite direction. However, the cause of the start and end in this change of direction of the

current is unknown. The phenomenon appears to run in cycles which recur every four to seven years. It warms the waters of the eastern Pacific and produces droughts throughout the area including the Pacific islands.

### 3.3.2. Normal Still-Water Elevations

The tidal datum relationships for Tinian Harbor are shown in Table 3-1 as compared with other local benchmarks in the Mariana Island chain. Significant differences in measured water elevations have been found throughout the islands, and any soundings or harbor design efforts must take into consideration the benchmarks used and the assumed difference between mean lower low water (MLLW) and mean sea level (MSL).

Table 3-1: Tidal Datum Elevations in the Project Vicinity (in feet)

	<b>Apra Harbor, Guam (2007)</b>	<b>Saipan Harbor (1969)</b>	<b>Tinian Harbor Survey (2013)</b>	<b>Tinian Harbor USGS (1969)</b>
<b>MHHW</b>	2.34	2.34	2.3	1.73
<b>MHW</b>	2.22	2.22	-	-
<b>MSL</b>	1.37	1.37	1.39	1.12
<b>MLLW</b>	0	0	0	0

Periodic tectonic activity results from subduction of the Pacific Plate beneath the Mariana Plate at the Mariana Trench. The overall result for Guam, Rota, Tinian, and Saipan is a significant uplift of the islands’ core land masses. Therefore, relative sea-level rise over the next 50 years is predicted to be negligible at Tinian and the other islands.

### 3.3.3. Typhoons, Maximum Waves, and Storm Surge

The CNMI is situated some 600 miles east of an area in the western Pacific where cyclonic disturbances often form. As a result, the CNMI is in what is known as weather condition four at all times, which means that 40 mile per hour winds are possible within 72 hours. These cyclonic disturbances can develop quickly and bring typhoon force winds of up to 120 miles per hour with gusts of 160 miles per hour or more. Typhoon season runs from July to January, and the islands of the CNMI are usually subject to at least one typhoon each year. The season of most serious storms is from August to mid-December. This is the period of the most frequent occurrence of tropical disturbances. Flooding and wind-damaged vegetation are a common result of frequent storms with winds above 60 mph.

Table 3-2: Storm Wave Forecast

<b>Return Period (Years)</b>	<b>Significant Height (Feet)</b>
<b>1</b>	13.58
<b>2</b>	16.53
<b>5</b>	20.43
<b>7</b>	21.86
<b>10</b>	23.38
<b>15</b>	25.11
<b>20</b>	26.33
<b>25</b>	27.28
<b>30</b>	28.06
<b>40</b>	29.28
<b>50</b>	30.23

Historical data shows that 32 typhoons and 22 severe tropical storms have passed within 60 miles of Tinian between 1950 and 2012 according to the U.S. Navy Joint Typhoon Warning Center<sup>9</sup>. Statistical forecasting tools yield a range of storm wave heights ranging from an annual occurrence of 13.6 feet to a 50-year wave of over 30 feet. Table 3-2 lists the forecasted, probable wave heights impacting Tinian Harbor, based on probable recurrence interval. The maximum offshore wave experienced in recent years was recorded in 2002 at over 28 feet significant height.

Typhoons also result in a storm surge that can raise the still-water level in the harbor due to wave setup and barometric pressure drop. Wave setup occurs when deepwater storm waves encounter a shoreline. For the 50-

<sup>9</sup> Navy Meteorology and Oceanography Command – Joint Typhoon Warning Center, Best Track Archives



year return period wave event this has been calculated at 1.4 feet at the Tinian Harbor breakwater. The still-water elevation within the breakwater would experience a similar increase due to wave setup.

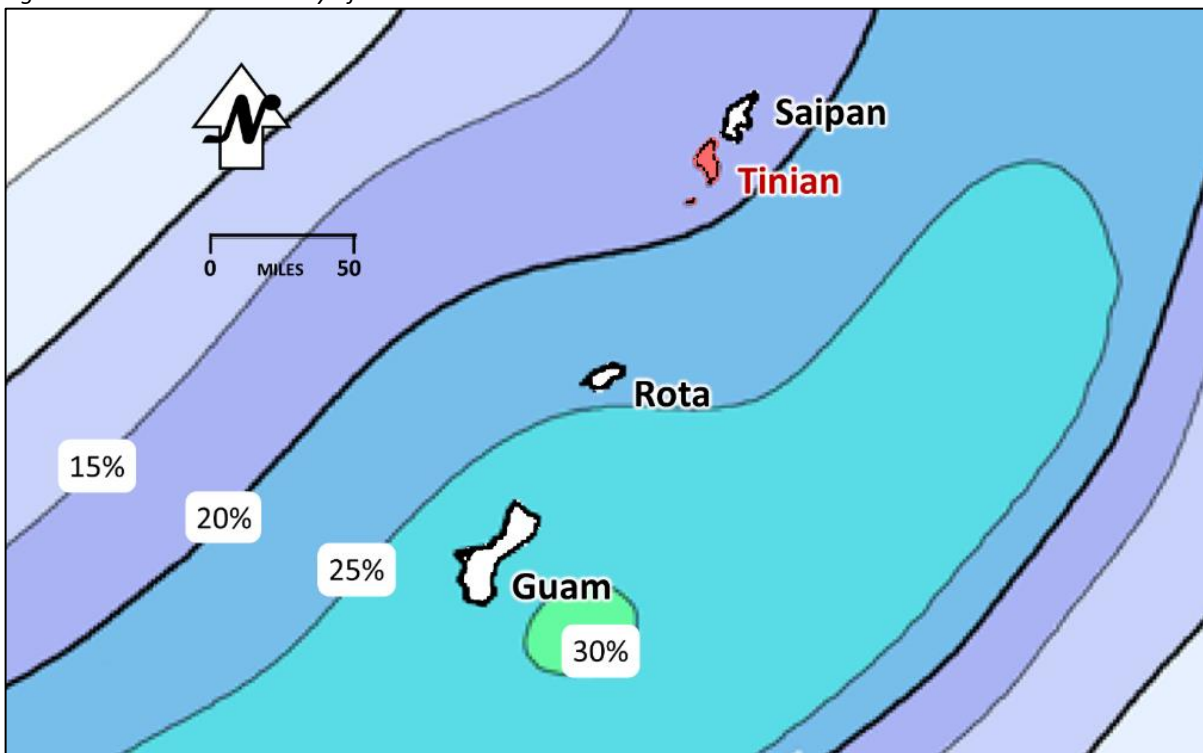
Barometric pressure-drop associated with cyclonic storms will also raise the still-water elevation. Based on barometric records from two recent storms, a water-level increase of 2.1 feet can be expected during a strong typhoon. Therefore, high water due to storm surge must be considered at +3.5 feet above the forecasted diurnal high tide.

### 3.4. Seismic Activity, Volcanos, and Tsunamis

Tectonic activity within the Mariana Trench can generate significant earthquakes; 23 tremors registering 7 or more on the Richter scale have been recorded since 1900. In 1993 an earthquake occurred on Guam, 120 miles south of Saipan which caused considerable damage. The earthquake history of Saipan since 1800 records two major events, one in 1849 and the other in 1902. Actual magnitudes are not known. While earthquakes can occur at any time in the Commonwealth, no serious damage has yet been documented on Tinian. Earthquakes with a magnitude of 4 to 5 on the Richter scale occur once or twice a year and there are weekly tremors which cannot be observed without instruments.

The epicenters of most earthquakes are located beneath the sea-bottom at the Mariana Subduction Zone and intensities generally diminish before reaching the Mariana Islands themselves. As the Pacific plate moves westward, earthquake frequency trades off with depth and distance from the islands, with the result that seismicity at different depths can dominate the hazard at different locations.

Figure 3-4: Percent Probability of Ground Acceleration Exceedance



Source: US Geologic Survey; Seismic Hazard Assessment for Guam and the Northern Mariana Islands; 2012

Figure 3-4 shows that the seismicity hazard at Guam is controlled by nearby shallow sources, whereas seismicity at Tinian and Saipan results from deeper events, farther away. Overall, the probabilistic ground motions within

the Mariana Chain can be significant, reflecting the high rates of activity and relative proximity of the seismic-zone sources, as well as their large maximum magnitudes.

In April 1990 an underwater earthquake measuring 7.5 on the Richter scale was recorded as occurring 225 miles northeast of Guam and 100 to 150 miles southeast of the island of Anatahan. All the islands within the archipelago experienced the tremor but no damage or injuries were reported. Tinian experienced a series of 10 foot tsunamis from that event. This earthquake took place at a time of increased volcanic activity on the island.

According to U. S. Geological Survey, islands north of Farallon de Medinilla are vulnerable to future volcanic eruptions. Esmeralda Bank, 24 miles west of Tinian, is the southern most active volcano in the Mariana Arc and is one of the most active vents in the western Pacific. It rises to within 100 feet of sea level and is considered to be an area of potential eruption or a "hot spot." In the early part of the 20th century the banks were reported to be above sea level but disappeared below water as a result of an earthquake.

## 4.0 Needs Assessment

### 4.1. Structural Rehabilitation

#### 4.1.1. North Quay<sup>10</sup>

Capacities of the existing North Quay wharf structures were evaluated based on the results of the field inspection and geotechnical boring program performed in 2014 and 2015. These evaluations were supplemented by record drawings for the facility. Very low seismic load was considered in the original design per the U.S. Navy's 1938 Design Data. Static earth pressure plus 400 psf surcharge was used for developing the original working loads. However, with the current deteriorated condition, a static earth pressure plus 250 psf surcharge is probably the maximum working load that the wharf could resist today. Since the application of static earth pressure and live loads appear to exceed the deteriorated sheet pile allowable stress limits, the reserved strength of the sheet pile will not be adequate to resist the seismic loads.

Berth 2 is actively used by Mobil for fuel deliveries. The mooring and fender systems at Berth 2 were upgraded and the concrete cap beam was repaired in 2011. However, the mooring and fender systems of Berths 1 and 3 are not adequate to support the berthing and mooring of design vessels (per Section 5.0 Design Vessels). In addition, repairs to the concrete cap beam and wharf pavements at Berths 1 and 3 are required in order to support standard operations. The North Quay (Berths 1, 2, and 3) needs the following improvements:

- At Berths 1 and 3, near term upgrade of the mooring bollards and fender system together with repair of the concrete cap beam and paved wharf area.
- A cathodic protection system is needed to minimize further corrosion.
- Replacement of the steel sheet pile wall to fully restore the capacity of the berths and strengthen the quay wall to meet the current seismic requirements.
- Any harbor or berth deepening would require a complete reconstruction of the existing quay wall to prevent over-span of the sheets and catastrophic collapse.

#### 4.1.2. Finger Piers and Connecting Pier

The Finger Pier and Connecting Pier have received minor repairs since they were constructed in 1945. All of the sheet pile walls that contain finger pier fill material have corroded and several sections have failed. Some upgrade to the finger pier connections and mooring elements were made about 1980, but these too have failed. The only functioning portion of these structures is a small Ro-Ro ramp on the Connecting Pier between Finger Pier A and Finger Pier B.

Tinian Harbor needs a Ro-Ro ramp and future improvement should preserve or improve the current ramp. In addition, if any new port structure is constructed in the location of the Finger Piers, the Connecting Pier will be needed for access from the land.

#### 4.1.3. West Quay

Approximately 385 lineal feet of the northern portion of the Connecting the West Quay Pier was retrofitted with a reinforced concrete cap beam directly above and behind the existing steel sheet pile wall under a repair project in 2007. This area is currently being used to berth small boats. In addition, the wall has no fendering and no way

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<sup>10</sup> M&N; Assessment of Tinian Harbor; May 2015

to board or debark from smaller vessels. Wave action and currents have brought sediment from the lagoon area and deposited it along the West Quay. Therefore the following improvements are needed:

- To minimize further corrosion, installation of a cathodic protection system is needed for the West Quay wall.
- A boarding float is needed to increase the utility of this area for small boats.
- Vertical fenders are needed to improve mooring for medium-sized vessels.
- Maintenance dredging to -6 feet MLLW is needed to restore water depth at the West Quay.

#### **4.1.4. Small Boat Harbor**

The small boat marina has sustained damage from wave action entering the harbor and from over-size boats tying in the slips. Inspection and repair of the existing slips is highly recommended. The floating docks also need additional guide-piles at the ends of the finger slips to support the load of larger boats.

#### **4.1.5. Breakwater**

The existing Tinian Harbor breakwater is severely degraded and the harbor site is exposed to ocean waves generated by passing storms. The use of steel sheet pile was commonplace in 1945 when the breakwater was constructed. This material could be transported and emplaced quickly using the equipment available during wartime. However, as primary harbor protection, it is generally not recommended due to the relatively short life expectancy of steel in the ocean environment unless a properly designed cathodic protection system is also provided and maintained.

Since wave energy within the harbor is responsible for much of the damage to fender and mooring systems, it is important that a program of breakwater repair or replacement be initiated as soon as possible. Breakwater improvement needs were assessed in the July 2015 *Tinian Harbor Condition Assessment and Breakwater Alternatives Evaluation* cited earlier. A summary of these needs includes:

- 3,500 foot rubble mound Main Breakwater with concrete armor units. The existing sheet pile caisson remnants and coral stone fill material could be incorporated into the core of the new breakwater.
- Main Breakwater crest elevation of +12 feet MLLW to prevent overtopping during normal storm wave events.
- A higher crest elevation to prevent any overtopping would result in a construction cost that could not be justified by the benefits. Therefore, during typhoon conditions, overtopping of a +12 foot crest would occur.
- 1,100 foot rubble mound North Breakwater with stone armor units. The crest to be 18 feet wide allowing construction equipment access to the Main Breakwater.
- North Breakwater crest elevation of +8 feet MLLW to prevent overtopping during storm wave events. As with the Main Breakwater, overtopping during typhoon conditions could occur.
- If overtopping is allowed to occur during typhoon events, Tinian would not be considered a “harbor of refuge” and would have to be evacuated during the near passage of a typhoon.

#### **4.1.6. Port Operations Area**

The port operations area is presently in serviceable condition. However, subsidence along the wharf margin indicates loss of material from behind the quay wall with corresponding loss of support for the pavement. Heavy mooring bollards have been installed at Berth 2, but equivalent bollards have not been provided at Berth 1 or Berth 3.

The existing security fence is in poor condition and lacks proper gate structures or traffic control stations. A new port building is under construction at the northwest end of the terminal. This building is adjacent to a replacement brown tree snake confinement area. As both of these facilities operate in direct conjunction with the port, reconfiguration of the existing security fence will improve operations.

The illumination towers are relatively new. However, their internal wiring requires some repair or replacement to make them function as designed. Additionally, there is no fire protection for the terminal and a firetruck from the airport must be brought on-site when tankers are discharging. This will not be a sustainable practice if aircraft are to be refueled at Tinian Airport and additional tanker calls are necessary in the future.

Based on these conditions, the port operations area needs the following structural rehabilitation and improvements:

- Excess soil and vegetation removal from along the wharf face.
- Pavement repairs to prevent further deterioration.
- Over the longer term, raise and repave the site in conjunction with replacement of the quay wall.
- New mooring bollards installed at Berth 3, similar to those at Berth 2.
- Clear non-essential fencing and other features from the Berth 1 area.
- Security fence upgrades to provide an improved entrance gate at the foot of Canal Street.
- Wiring and rehabilitation of the existing illumination towers.
- An oil-spill containment system is needed at the fuel riser location.
- A fire suppression system is needed for the tanker berth.

## **4.2. Cargo and Vessel Service Needs**

### **4.2.1. Fuel and Other Liquids**

The mooring location at Tinian Harbor Berth 2 was recently reconstructed, including pipeline risers and engineered mooring bollards. Power generation on the island is fueled by imported diesel oil. Motor vehicle fuel is also imported by tanker. Although jet fuel is not currently imported, future military activities may require near-terminal jet fuel receiving and distribution facilities. If future direct international passenger jet arrivals are to be accommodated on Tinian, then civilian airport refueling capabilities will be required. DoD Air Force and Marine Corps activities on Tinian are also expected to require a dedicated fuel import system. Three alternatives are being considered by the military:

1. Reconstruction (replacement) of a former offshore mooring with underwater pipeline connection to the island.
2. Use of CPA Berth 2 with pipeline connection from the wharf to storage tanks at Tinian Airport.
3. Use of CPA Berth 2 with short pipeline connection to near-dock fuel storage and distribution tanks.

DoD has not finalized their plans, but has proposed several variations on the near-dock storage facility. One plan located a new fuel tank farm directly next to the existing Mobil fuel tanks and a 2016 DoD EIS<sup>11</sup> located the tanks farther to the northeast on vacant CPA land.

The DoD plans do not consider impacts to the Mobil fuel storage facility or the port. Review of lease documents indicates that the Mobil tanks were constructed in the early 1970s and the facility lease will expire in 2020. Therefore, any plans for new tankage should consider relocation of the existing fuel tanks to optimize the

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<sup>11</sup> HQ PACAF Joint Base Pearl Harbor-Hickam, HI; *Final EIS for Divert Activities and Exercises*; September 2016

terminal layout for better efficiency. Based on the projected demand growth, and the age of the existing Berth 2 quay wall and tankage, the following needs are identified for fuel and other liquids:

- Expanded tanker mooring area and a second fuel riser at Berth 3.
- Deeper draft vessel accommodations (i.e., capital dredging) at Berth 2 and Berth 3 with a reconstructed quay wall engineered to sustain deeper berth.
- Relocation of the existing Mobil tanks in conjunction with the DoD planned fuel receiving and new pumping and storage facility.
- On-terminal fire suppression system.
- Near-terminal oil spill containment and cleanup facility.

#### **4.2.2. General Cargo**

Consumer goods, building materials, and military supplies are imported by general cargo vessels and by barge. Future DoD construction and casino development will increase the need for construction material. A concrete batch plant is planned within one mile of the port to support construction activities. Therefore, periodic calls by larger vessels will occur during construction and for sustainment of the casinos.

There have been periodic efforts to establish an export market for Tinian produce and commercial fish landings. A refrigerated storage building was constructed near the East Quay, but never fully utilized. With growth of casino and hospitality activities on Tinian, the need for near-dock refrigeration will increase. This would initially be imported fresh food and perhaps later exported produce and fish. Prior to reconstructing the refrigerated storage unit, a refrigerated container “cross-dock” with power plugs could provide a flexible interim measure.

Increased container and cargo arrivals from Guam and from international ports will require customs control, agricultural inspection and brown tree snake interdiction services. Therefore, a closer link between the commercial seaport and the new CPA port administration building will be needed.

During DoD exercises, a large quantity of wheeled, palletized, and containerized cargo is offloaded on Tinian. This activity is expected to increase in the coming years in conjunction with the U.S. DoD build-up in Guam. When the DoD Military Sealift Command (MSC) vessels are at dock in Tinian Harbor, they occupy berthing and storage normally used for general cargo and liquid bulk fuels. Therefore, expanded general cargo berthing and operating area will be necessary as construction activities compete with DoD activities. For increased general cargo demand, the following marine terminal needs have been identified:

- A second improved berth that can take either military or civilian general cargo.
- A dedicated berth for bow or stern loaded Ro-Ro cargo.
- Expanded upland storage and staging that is flexible for both civilian and military cargo.
- A second terminal entrance gate that can be dedicated to military vehicle movement when necessary.
- Incorporation of the CPA administration offices and the brown tree snake containment facility into the controlled marine terminal area.

#### **4.2.3. Inter-Island Passengers and Ro-Ro Vehicles**

Tinian has had a history of passenger ferry service to Saipan dating from 1998 when a high-speed ferry service was introduced in conjunction with the Dynasty Hotel and Casino complex. Service was suspended in 2010 when the ferry operator could no longer afford to maintain the vessels. The lack of ferry service has contributed to the decline of tourism on the island.

Developments currently underway include plans for resumed service with Ro-Ro capable vessels. Two separate ferry services are proposed, one would accommodate both walk-on passengers and automobiles. The other service will operate a larger vessel with capacity for two and three axle trucks. Presently, the BIG Casino development includes a proposed ferry landing for the larger vessel at their leased property on Berth 4. However, condition of the berth and wave activity at the east end of the terminal may impede ferry operations.

The smaller ferry, as proposed by Alter City Group<sup>12</sup>, would rely on CPA berthing facilities on Tinian, likely near Berth 1 or the Connecting Pier. Additionally, construction equipment and materials are loaded or unloaded in Tinian Harbor by small landing-craft type Ro-Ro vessels. This activity takes place at a small ramp constructed on the connecting pier between Finger Pier A and Finger Pier B. Based on these identified needs, Tinian Harbor ferry and Ro-Ro facilities should include:

- A Ro-Ro ramp that is suitable for both landing-craft vessels and inter-island ferries. This ramp should also be large enough to accommodate the military bow ram Ro-Ro vessels such as the ITB *Thunder* and *Lightning*.
- Vehicle and passenger circulation routes that are separated from the secure port operating area and berths.
- Passenger waiting and pick-up areas including a passenger shelter.

#### **4.2.4. Military Exercises**

The DoD leases approximately 15,347 acres of northern Tinian that are used for field training. Recent exercises have involved commercial vessels and specialty Navy ships. Future plans could include expansion of Air Force activity at Tinian Airport for diversion exercises and humanitarian support. In addition to the fuel import facilities, general cargo needs, and Ro-Ro vessel accommodations described in earlier paragraphs, military exercises may need a separate and secure berth for offloading munitions and other cargo that is away from the hotel and casino complex as well as other civilian uses.

The U.S. Military Sealift Command (MSC) in Guam currently requires 44 feet of depth in Apra Harbor. In a recent study,<sup>13</sup> the DoD requested evaluation of harbor depths up to 42 feet in the Tinian Harbor channel and turning basin. This indicates their interest in providing future deep-draft berthing in Tinian. Based on this information, future military exercises will generate the following needs:

- Additional berthing, particularly specialized Ro-Ro berthing including a hardened landing pad for vessels with slewing stern ramps such as the Expeditionary Fast Transport vessel (EPF).
- Secure offloading, loading and circulation areas that do not interfere with essential civilian cargo activities.
- Berths that are designed for deeper draft vessels
- Future expanded berthing to accommodate munitions transfer and longer-term vessel calls.

#### **4.2.5. Cruise Ship Calls**

Cruise lines have expressed interest in calling Tinian in the past. However, shallow harbor depth, low quality mooring and fendering, and a lack of tourist amenities have discouraged cruise operators from including a Tinian

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<sup>12</sup> Note, Alter City Group may abandon their casino and ferry plans as of the end of 2017.

<sup>13</sup> U.S. Army Corps of Engineers; Tinian Harbor Condition Assessment and Breakwater Alternatives Evaluation; July 2015

stop. The planned casino and tourism developments on Tinian could create a demand for cruise ship calls and berthing for chartered yachts. Cruise ships generally need:

- Passenger landing and customs-immigration control facilities.
- Adequate transportation infrastructure and tourism opportunities.
- Depth at berth of at least 28 feet to 30 feet to provide adequate under-keel clearance.
- High quality mooring and fendering hardware.

#### **4.2.6. Future Harbor Operations Analysis**

The Tinian Harbor commercial marine terminal uses approximately five acres of storage and operating area directly behind the North Quay. With local distribution and a single dry cargo berth in operation, the berth cargo throughput capacity of approximately 250,000 tons per year limits the terminal. The storage area has a capacity for about 750,000 tons per year of wheeled and grounded dry cargo. However, if the need for fuel delivery and military vessel berthing is considered, then the berth capacity is reduced significantly and may not be adequate for the terminal's needs. By adding an additional dry cargo berth, the operating throughput capacity would more than double.

Based on the economic and demographic trends along with forecasted cargo growth, operation at the existing berthing and storage area is adequate for civilian cargo in the foreseeable future. However, if casino tourism construction material is to be stockpiled near the port, or if military exercises need longer-term cargo storage or vehicle parking, then an expanded contiguous storage area would be needed. Passenger ferry and cruise ship calls will also require terminal facilities including secure circulation areas, security screening, CBP offices, and other non-cargo services. Based on these trends and observations, the following operational needs have been identified:

- A second dry cargo berth with improved fendering and mooring capabilities.
- Re-aligned fence to allow development of expanded operations, storage, and development of value-added port activities to the north.
- Fence and gate improvements at the west end of the harbor to facilitate passenger and private vehicle circulation.

### **4.3. Recreational Needs**

Tinian Harbor includes the only small boat facilities on the island. Residents use it for recreational boating, subsistence fishing, and informal trade with Saipan. The existing small boat harbor includes a marina, launch ramp, picnic area, and commercial fish landing area. However, it lacks amenities such as public toilets, fish cleaning stations, boat wash-down area and nearby boat storage. Users have stated that more slips are needed, especially during fishing tournaments and seasonal fish runs.

Recreational boating is important to the Tinian residents, but it also provides an opportunity for tourist excursion boating, charter fishing businesses and scuba charters. Proposed improvements to the recreational harbor facilities include:

- A public toilet and washroom to accommodate visitors and boaters.
- A public hoist, fish scale wash down and cleaning area to prevent use of the picnic tables for fish cleaning.
- Improved boat wash-down, trailer parking and a fenced storage area.
- Expanded picnic and outdoor activities area with lighting for evening use.



- Launch ramp improvements and expanded small boat storage facilities.

#### 4.4. Upland Development Needs

The 1997 Tinian Harbor Master Plan projected a need for upland container storage based on the robust population growth estimate used at that time. Since 1997, the loss of garment industry jobs in the CNMI and the decline of the Dynasty Hotel and Casino have contributed to a relatively flat population curve. A 1994 study<sup>14</sup> accurately predicted the population growth from 1990 to 2010 at about 2% annually as a “baseline” needs assessment. Construction and operation of new casinos coupled with renewed DoD activities on the island may draw more residents to the island, but there is no reason to expect the geometric growth predicted in the 1997 plan. Therefore, backlands near the port will not be needed for the intense container storage uses projected in 1997. However, the 1997 plan did recommend that facilities that are not waterfront-dependent be located away from the marine terminal. This recommendation still holds true.

With hotel and casino development under construction at Berth 4 and the East Quay, the land-use dynamic in the eastern portion of Tinian Harbor has shifted away from cargo handling and toward tourism-related economic activities. Therefore, the greatest benefit to the island population will come from enhancing CPA property that is adjacent to the hotel and casino to offer retail and other activities compatible with that use.

While tourism-based retail attractions can act as an effective buffer between the guest accommodations and the marine terminal, adequate backlands for cargo, commercial and defense related port activities must be maintained near the active cargo berths. Therefore, non-port activities should be planned for CPA parcels located farther from the harbor. The shift in island demographic, on-dock and near-dock activities, and military uses, generates the following recommended upland development needs:

- An open market place for Tinian small merchants that is within close walking distance from the new hotel and casino complex.
- A parcel dedicated to commercial retail, restaurant, and entertainment activities that is also accessible from the casino.
- Future cargo marshalling, storage and value-added laydown area adjacent to the commercial port.
- Relocation of non-waterfront dependent activities such as fuel storage and waste incineration away from the waterfront. This has the added benefit of placing such activities away from the hotel and casino complex.
- Preservation and development of a public access small boat and recreational area that can also be used for fishing, diving and sight-seeing charters.

#### 4.5. Navigation Improvement Needs

When Tinian Harbor was constructed, the entrance channel was designed for 30 feet and the harbor basin to 28 feet below mean lower low water (MLLW). No maintenance dredging has been conducted since and bathymetric surveys show the basin and entrance channel to be generally deeper than the reported original dredge depth.

The harbor was originally designed to accommodate the fleet configuration in 1945 with larger ships anchored offshore and lightering cargo by landing craft and other vessels. Currently, vessels serving the Mariana Islands

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<sup>14</sup> Dames & Moore, Juan C. Tenorio & Associates, Austin Hansen International; Island of Tinian Master Plan Strategy Study: Commonwealth of the Northern Mariana Islands; March 1994.

from international ports of origin have somewhat deeper draft than the port can accommodate and previous studies have recommended channel deepening. Cargo vessels can arrive at Tinian light loaded, particularly if they have made a first port of call on Saipan or elsewhere. However, cruise ships do not have this option and many ships in the Western Pacific rotations draft too deep to safely enter the harbor. The DoD has also requested modeling and consideration of deeper channel and berth depths at Tinian, ranging from 35 feet to 42 feet at the entrance channel and turning basin.

To accommodate deeper draft vessels at the North Quay, the berth areas would have to be capital dredged from their current 24-foot to 26-foot depth, to minus 32 feet MLLW or deeper. However, the quay wall was not designed for this depth and dredging would undercut or over-span the wall sections, resulting in failure of the structure. Further, should the channel be deepened for larger vessels, the inner reach may not be wide enough at 500 feet for safe entrance.

The current entrance channel is well marked with buoys and channel markers. However, it has a 60 degree turn that must be negotiated and no range markers have been set to assist the pilot. The port also does not have a permanent tug, and vessel assistance must be called in from Saipan. Based on these conditions, Tinian Harbor has the following navigation needs:

- Water depth of 32 feet below MLLW at Berth 2 and Berth 3 to allow tankers to arrive fully laden and to accommodate cruise ships. This dredging cannot occur prior to reconstruction of the quay wall.
- Water depth of 35 below MLLW at the entrance channel and turning basin for safe vessel movement.
- Future DoD berthing to be designed for a 42-foot dredge depth.
- Lighted range markers for both the outer reach and inner reach of the channel. These ranges should be equipped with radar reflectors for conditions of reduced visibility.
- When regular calls by larger vessels become more frequent at Tinian Harbor, a vessel-assist tug should be stationed at the port. This will be essential if typhoon conditions require evacuation of the harbor, as a tug from Saipan may not be available under those circumstances.

## 5.0 Design Vessels

Evaluation of Tinian Harbor and development of Master Plan berth and channel recommendations is largely driven by the range of ships, barges, and other watercraft that are expected to call at the terminal. The principal dimensions of these vessels comprise a range of values that are taken as the “Design Vessel” for each mode of cargo transport and maritime service expected at the terminal. For the Tinian Harbor Master Plan, the current calling vessels are generally taken to define the Design Vessel. Harbor dredging may take place within the planning horizon, enabling larger and deeper draft vessels to call. Therefore, some consideration is given to vessels that are beyond current harbor limitations.

### 5.1. Fuel Tankers

Liquid fuel, needed for power generation and motor vehicles, is imported by tankers that call at Tinian Harbor Berth 2. Although jet fuel is not currently imported, future military activities may require the development of near-terminal jet fuel receiving and distribution facilities. The current fuel supply tanker *Akri* is shown in Figure 5-1.

Figure 5-1: Typical Tanker Calling Tinian



Source: Mobil

Over the past decade, Mobil Oil Mariana Islands, Inc. (Mobil) has used a variety of chartered vessels at Tinian Harbor. Table 5-1 shows the range of tankers that have called Tinian in recent years. The design draft of vessels larger than 400 feet in length would require additional dredging at Tinian Harbor. Typical tanker vessels serving Tinian are around 400 feet in length and draw 25 to 26 feet fully laden. Allowing for adequate under-keel clearance, tankers must arrive in Tinian with less than a full load of fuel.

Table 5-1: Tanker Design Specifications

Principal Dimensions	Design	Minimum	Maximum
Length	350 feet	344 feet	400 feet
Beam	54 feet	54 feet	62 feet
Draft	25 feet	25 feet	26 feet

## 5.2. Containers and General Cargo

Consumer goods, building materials, and military supplies are currently imported by general cargo vessels and by barge. The economics of vessel operation shows that 45 TEU per week (roughly 2,340 TEU per year) would be needed to cover the cost of a dedicated international container service. Therefore, sustainment cargo needs on Tinian will continue to be served via smaller inter-island barge and/or container vessels of less than 250 TEU capacity until that threshold has been reached.

Figure 5-2: Tug Chamorro and 2000 Series barges



Source: Saipan Stevedore Company, Inc.

Figure 5-2 illustrates the ocean-going tug and deck-barge currently used for container and break bulk material transport to Tinian. For transit to Tinian, the tug will tow the barge on a cable for most of the voyage. On arriving at Tinian Harbor, the tug will slack the cable and “jackknife,” taking the barge alongside or “on the hip.” The tug-barge combination is more maneuverable in this configuration, and usually has no trouble negotiating the Tinian Harbor entrance channel. Table 5-2 lists the harbor design parameters of the tug and barge combination currently in use. Channel and harbor depth and dimensions are suitable for this type of vessel under current conditions. Wharf repairs to include new fendering would improve berthing conditions.

Table 5-2: Tug-Barge Design Specifications

Principal Dimensions	“2000” Series Barge Only	Tug Chamorro Only	Tug with Barge (jackknifed)
Length	200 feet	105 feet	210 feet
Beam	55 feet	27 feet	82 feet
Draft	n/a	14 feet	14 feet

Future DoD construction and casino development will periodically increase the need for construction material. Therefore, chartered container vessels are likely to call on an as-needed basis. These vessels could reach 500 feet in length and draft as much as 26 feet. Because of the crane limitations on Tinian, most chartered vessels are often equipped with ship’s cranes for cargo transfer. Figure 5-3 shows a typical small “geared” container ship that carries its own crane for loading and unloading containers.

Figure 5-3: Typical Geared Containership



Source: Saipan Stevedore Company, Inc.

Small container ships, including those with ship’s gear and those with open decks, range in size from converted offshore oil service vessels that are less than 200 feet long, to ocean going ships of 500 feet or more. For Tinian Harbor, depth at berth generally limits vessel size to about 400 feet and 25 feet draft.

Table 5-3: Container and General Cargo Ship Specifications

Principal Dimensions	Design	Minimum	Maximum
Length	425 feet	156 feet	500 feet
Beam	54 feet	38 feet	60 feet
Draft	25 feet	16 feet	26 feet

Table 5-3 lists the primary dimensions of container and general cargo ships currently serving the Mariana Islands. The smaller vessels are limited to inter-island trade, but larger ships will be needed to bring building material and supplies from international ports of origin. The design vessel for current conditions would be about 425 feet long, approximately the length of Berth 2. Fully laden, at a 25 foot draft, this ship would likely be too deep to safely call at the Tinian Berths. Therefore, the vessel would likely arrive “light” at about 23 or 24 feet to allow sufficient under-keel clearance at berth.

### 5.3. Inter-Island Passengers and Ro-Ro Vehicles

Tinian has had a history of passenger ferry service to Saipan. However, ferry service was discontinued when the vessel operator filed for bankruptcy. Closure of the Dynasty Hotel and Casino reduced passenger service demands and ferry operations were not restarted. Developments currently underway include plans for resumed ferry service with Ro-Ro capable vessels. Additionally, construction equipment and materials are loaded or unloaded in Tinian Harbor by small landing-craft type Ro-Ro vessels.

Figure 5-4: Ro-Ro Ferry Vessel



Source: [www.seamanrepublic.com](http://www.seamanrepublic.com)

Figure 5-4 illustrates the type of large ferry under consideration for a Saipan-Tinian service. This twin-hulled vessel can accommodate a mixture of cars and large trucks, providing an alternative mode to bring cargo to Tinian. The way it is presently configured, this type of vessel requires a specialized float for transferring vehicles. However, a more suitable configuration would include a simple bow-ramp that can be lowered onto a fixed Ro-Ro ramp at the terminal.

Table 5-4: Ro-Ro Ferry Dimensions

Principal Dimensions	Design	Minimum	Maximum
Length	206 feet	127 feet	206 feet
Beam	57 feet	38 feet	57 feet
Draft	7.0 feet	4.3 feet	7.0 feet

A smaller ferry vessel has also been proposed for Tinian and both ferries may be put into operation, serving two different casinos. Table 5-4 shows the range of ferry dimensions considered for a Tinian service. A smaller landing craft vessel of about 78 feet in length is currently in service and would use a Ro-Ro ramp suitable for ferry operation.

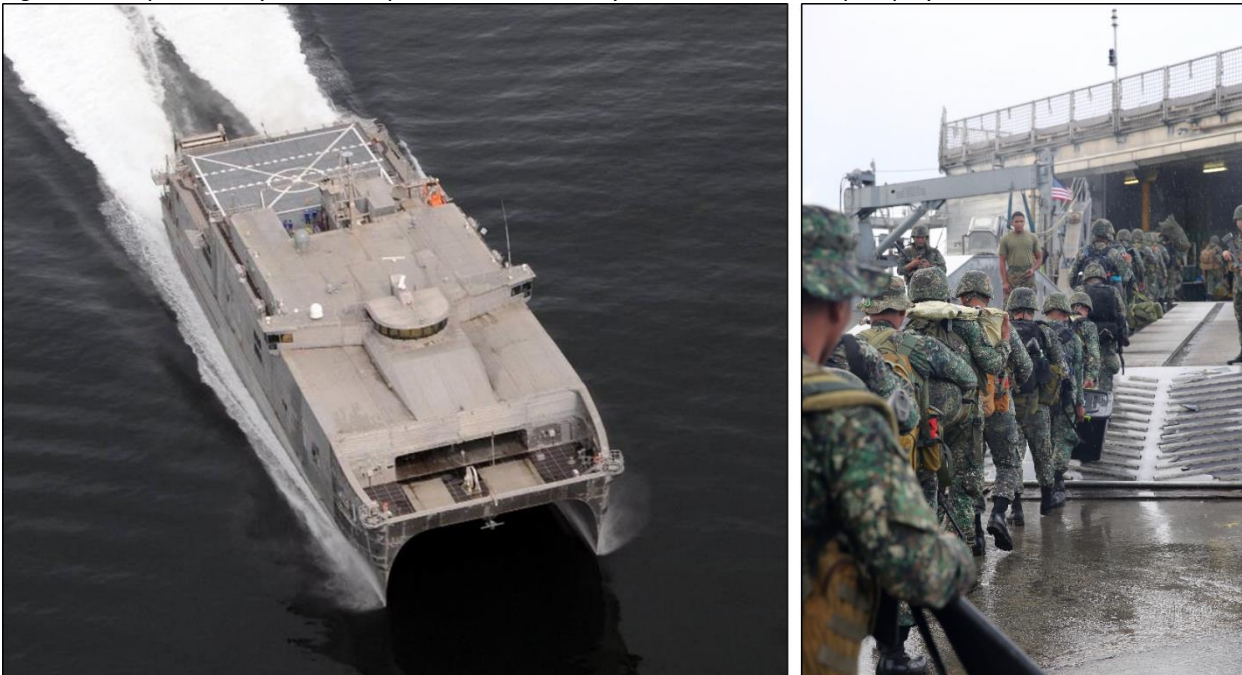
## 5.4. Military Supply Vessels

The DoD leases approximately 15,347 acres of northern Tinian that is used for field training. Recent exercises have involved commercial vessels and specialty Navy ships. Future plans could include expansion of Air Force activity at Tinian Airport for diversion exercises and humanitarian support. In addition to chartered commercial ships, the military has two specialized vessels designated to operate at Tinian Harbor.

### 5.4.1. Expeditionary Fast Transport Vessel

The DoD plans to deploy their Expeditionary Fast Transport (EPF) during exercises at Tinian. This ship, as illustrated in Figure 5-5, combines rotary wing aircraft transport capability, personnel accommodations, and Ro-Ro cargo. The EPF moors on its starboard side with a slewing stern ramp to offload wheeled vehicles and personnel.

Figure 5-5: Expeditionary Fast Transport Vessel Underway and with Stern Ramp Deployed



Source: U.S. Military Sealift Command

The EPF is a large twin-hull vessel that moors starboard-side-to and loads via an extendable stern-ramp. The vessel dimensions are shown in Table 5-5. At a 13 foot draft, the harbor depth does not limit this vessel. However, the very wide beam may constrain vessel movement at adjacent berths. Although the length is compatible with the design length of Tinian Harbor berths, the extensible stern ramp and vehicle maneuvering requirements may require an additional 100 feet of wharf length. As the EPF is an aluminum hulled vessel, it requires high-quality fendering at berth.

Table 5-5: EPF Design Specifications

Principal Dimensions	EPF
Length	338 feet
Beam	94 feet
Draft	13 feet

### 5.4.2. Integrated Tug-Barge

The U.S. Marine Corps uses a MSC integrated tug-barge (ITB) for delivery of material and supplies to its various operational sites. The tug *Thunder* and barge *Lightning* have called recently at Tinian and are slated for future deployments. The deck-load on *Lightning* can be lifted off by shore crane. However Ro-Ro cargo stored below deck must unload via a bow-ramp. Recent calls by *Lightning* required the vessel to turn perpendicular to the dock in order to discharge wheeled cargo.

Figure 5-6: ITB Joined and Underway

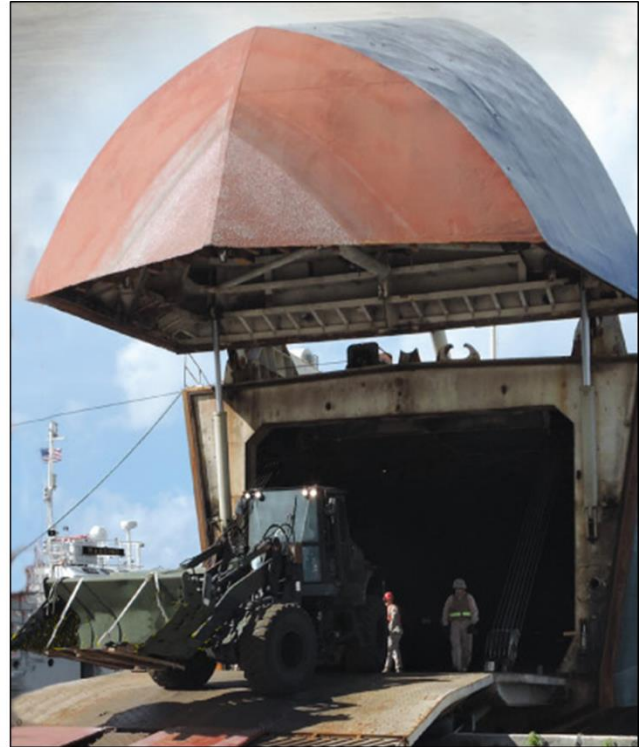


Source: U.S. DoD

While an ITB is underway, approximately half of the tug is embedded within the stern of the barge as shown in Figure 5-6. Therefore, the barge must load and discharge from a ramp at the bow. Figure 5-7 shows the tug *Thunder* separated from the barge. Two large bolsters on either side of the vessel lock into corresponding recesses in the hull of the barge. The figure also shows how Ro-Ro cargo is discharged from the bow of the barge *Lightning*.



Figure 5-7: Tug Thunder and ITB with Open Bow Ramp



Source: U.S. Military Sealift Command

At a combined length of 511 feet, the ITB requires all of Tinian Berth 2 and a portion of Berth 3 to dock. When turned 90 degrees to unload, it blocks access to all of the other berths. Therefore, when the ITB is in port at Tinian, the Mobil tanker cannot berth to replenish the island’s fuel supply. Improvement of Berth 1, with the addition of a Ro-Ro ramp on the Connecting Pier, plus fendering, mooring, and liquid bulk transfer capabilities at Berth 3 would allow the Mobil tanker to call while the ITB is in port.

Table 5-6: ITB Design Specifications

Principal Dimensions	ITB Barge Only	ITB Tug Only	ITB Tug-Barge
Length	460 feet	120 feet	511 feet <sup>15</sup>
Beam	65 feet	44 feet	65 feet
Draft	20 feet	n/a	20 feet

Table 5-6 lists the principal design dimensions of the ITB Thunder and Lightning that calls at Tinian Harbor. At a 20 foot fully-laden draft, the ITB is compatible with current harbor working depths. Its length and need for bow-loading facilities currently limits commercial operations when the ITB is in port.

<sup>15</sup> Half of ITB tug length is docked within barge stern section while underway

## 5.5. Cruise Ships

Cruise lines have expressed interest in calling Tinian in the past. However, shallow harbor depth, low quality berthing, and lack of tourist amenities have discouraged cruise operators from including a Tinian stop. The planned casino and tourism developments on Tinian could create a demand for cruise ship calls and berthing for chartered yachts.

Figure 5-8: Typical Small Cruise Ship in the Western Pacific



Source: Silverseas Cruise Line

Figure 5-8 illustrates the type of small “boutique” cruise ship that typically operate in the Western Pacific and Micronesian islands. These vessels cater to a select market that is willing to pay for unique programs and destinations. A vessel such as this may have no more than 200 to 300 passengers and would not overload the island’s facilities or attractions.

Table 5-7: Tinian Harbor Cruise Ship Design Specifications

Principal Dimensions	Design	Minimum	Maximum
Length	450 feet	338 feet	790 feet
Beam	60 feet	51 feet	98 feet
Draft	25 feet	14.6 feet	25 feet

Cruise operators are very sensitive to the quality of passenger experience, and to the safety of their vessel. Tinian Harbor does not offer sufficient under-keel clearance for most of the small cruise ships in operation, nor does it have adequate fendering at any berth other than Berth 2. To attract a cruise ship call, Tinian Harbor would need a minimum depth of -28 feet at berth and sufficient transportation infrastructure, such as busses or shuttles, and tour agencies to provide an attractive passenger experience.

## 6.0 Tinian Harbor Master Plan

### 6.1. Commercial Harbor

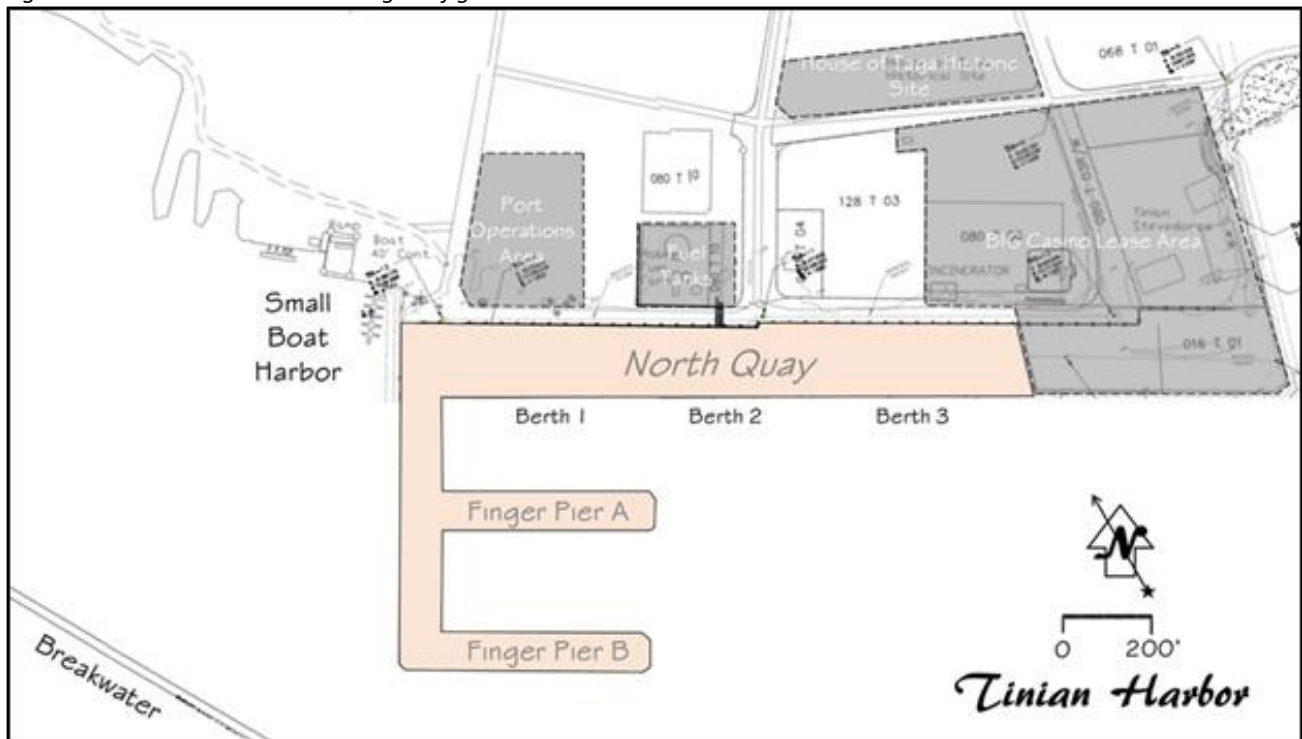
#### 6.1.1. Harbor Layout Alternatives

Based on site observations, previous studies and stakeholder input, three alternative harbor plans were developed that would accommodate community, CPA, and DoD needs within the twenty year planning period. This alternative assessment considered the needs identified in the stakeholder interviews, the design vessel review and cargo projections.

#### Existing Harbor / No Change

The existing marine terminal has served Tinian since 1945. At 1,400 feet of contiguous wharf and five acres of cargo storage, the commercial marine terminal has enough physical capacity to serve the Island of Tinian for the foreseeable future. However, the existing berths must be reconstructed due to the structural deterioration, to allow deeper draft vessels, to ensure stability of the quay wall and to allow deeper draft vessels. In addition, improved ferry and Ro-Ro facilities are needed.

Figure 6-1: Marine Terminal Existing Configuration

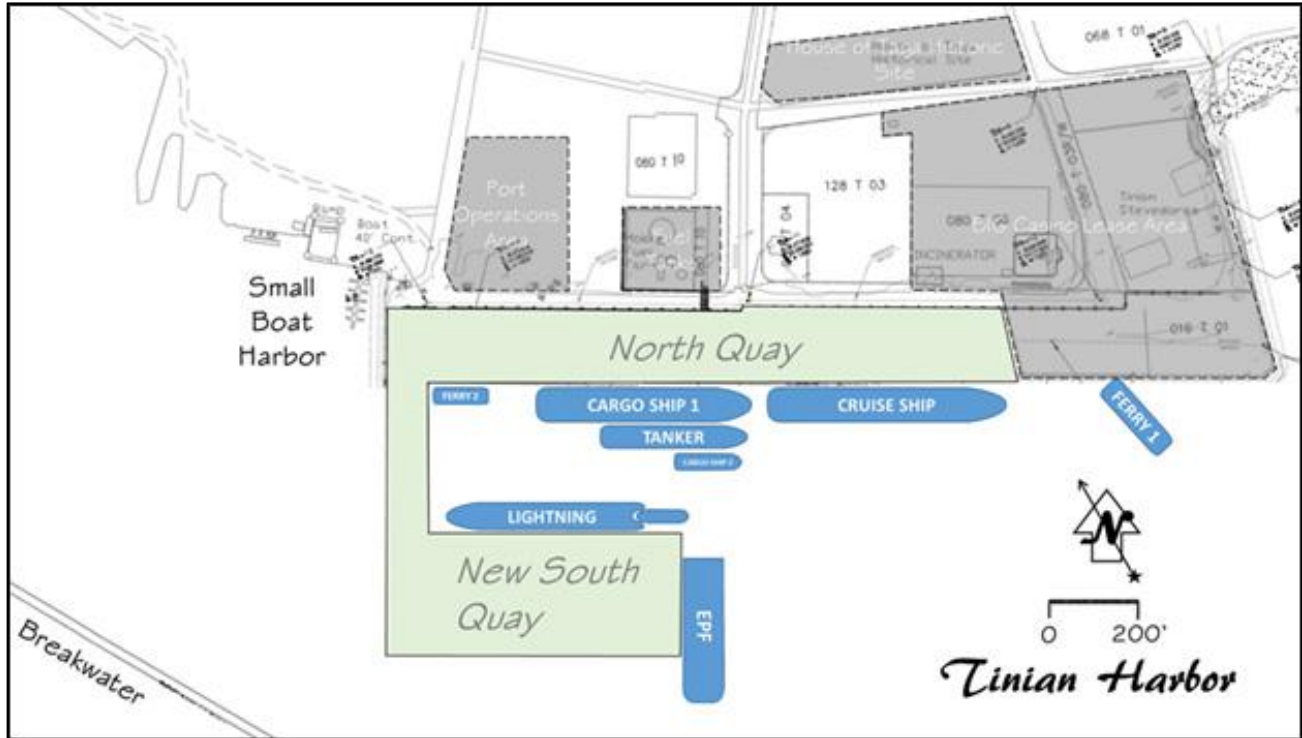


The existing facility could be renovated in phases, concentrating on replacement of the North Quay bulkhead and adding a Ro-Ro ramp to the Connecting Pier as needed. The finger piers have deteriorated to the point where they are no longer in service and could be fenced and abandoned in place. However, configuration of Finger Pier A constrains navigation and berthing at the existing Berths 1 and 2. Fill material and collapsed sheet piles could present a navigation hazard. Additionally, increased military presence on Tinian will occupy much of the available berth space when exercises are in progress.

## Alternative 1

Prior studies have investigated several alternatives to develop additional terminal capacity for both military and civilian uses. Master Plan Alternative 1 is derived from the earlier considerations, specifically from the recommended plan<sup>16</sup> developed in the 2015 condition assessment. This Alternative includes full reconstruction of the existing 1,400 feet of quay wall, demolition and removal of Finger Pier A, reinforcement of the Connecting Pier, and construction of a new South Quay berthing and cargo area.

Figure 6-2: Marine Terminal Alternative 1



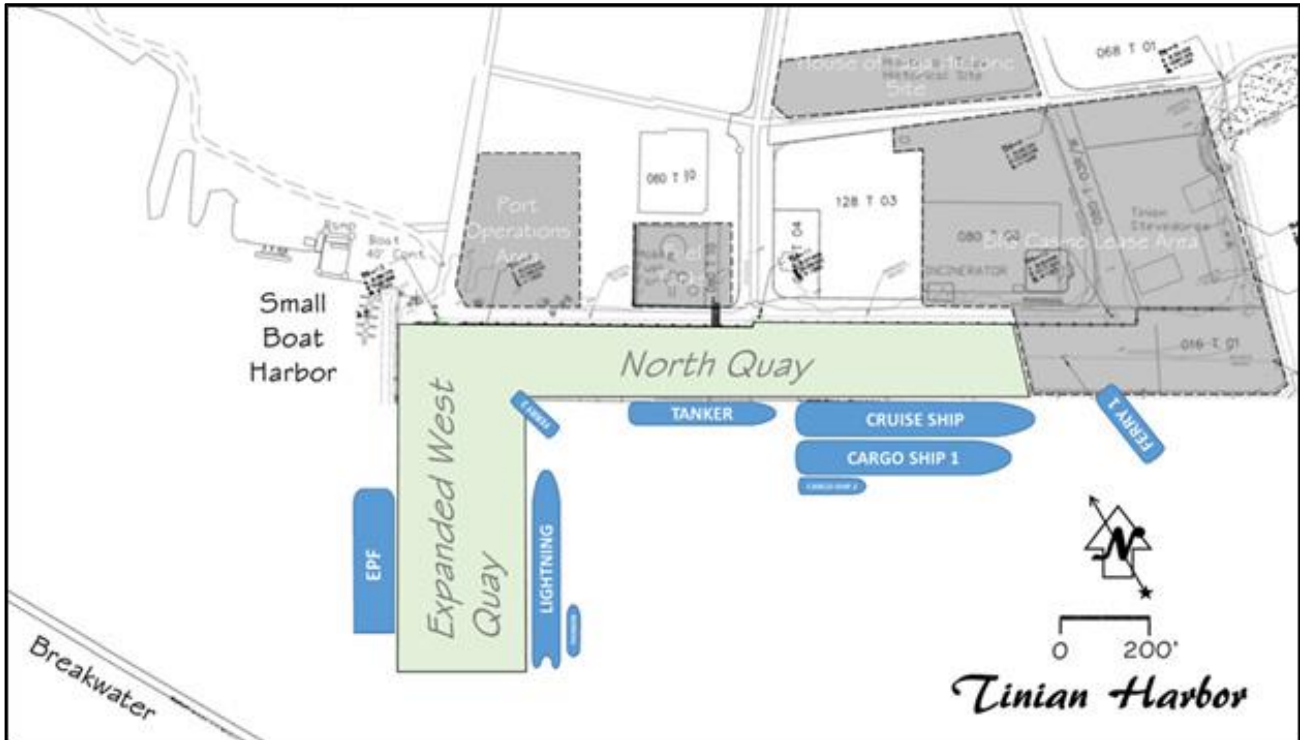
Alternative 1 has the advantage of maintaining all of the existing harbor activities in their existing configuration and adding an auxiliary terminal at the New South Quay for military or other specialized use. However, this alternative has a higher construction costs (than comparable Alternative 2 to follow) and development of the New South Quay must take place as a single project.

<sup>16</sup> M&N; Assessment of Tinian Harbor; May 2015

## Alternative 2

As a means of reducing construction cost, Alternative 2 expands the West Quay to develop the Connecting Pier as a new berthing and cargo handling area. Finger Pier A and Finger Pier B would be demolished to create a larger turning basin between the North Quay and the new facility.

Figure 6-3: Marine Terminal Alternative 2

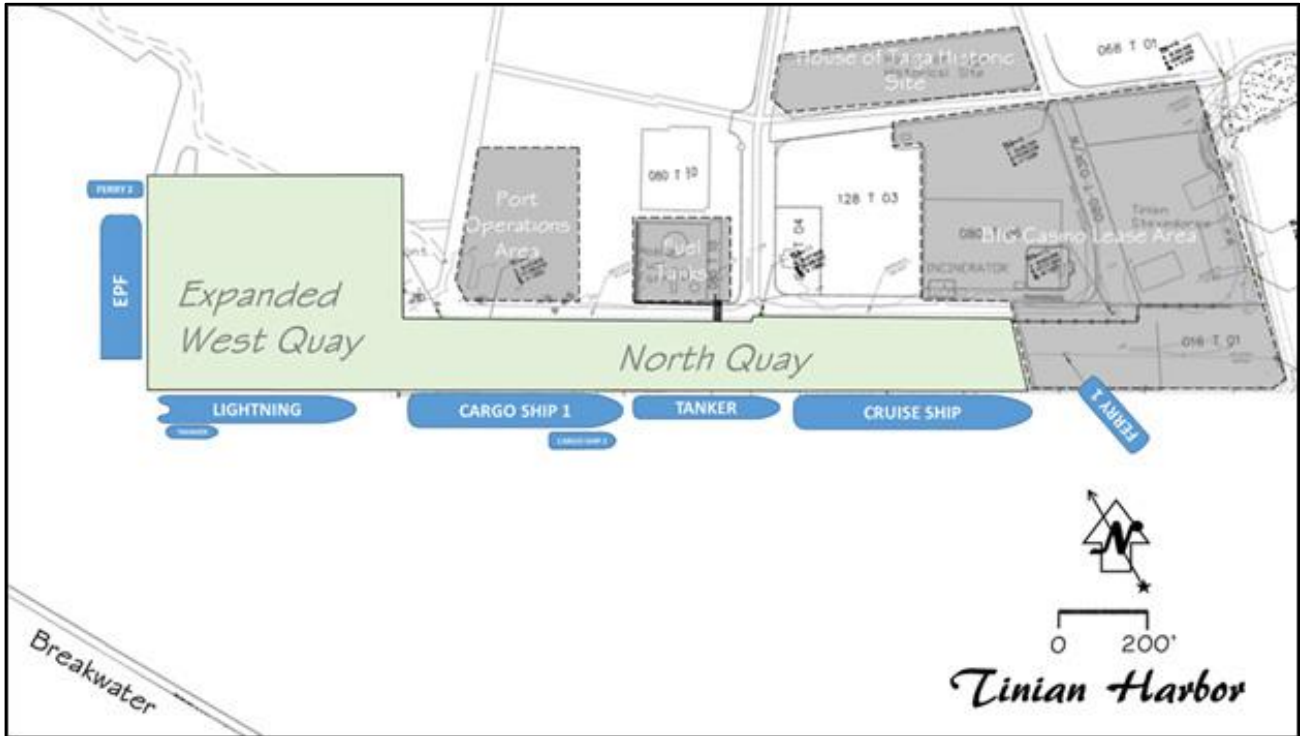


Aside from its lower cost compared to Alternative 1, Alternative 2 maintains many of the terminal uses in their current configuration. However, it displaces most of Berth 1. As with Alternative 1, expansion of the West Quay could not be accomplished in phases and must take place as a single project to be effective.

### Alternative 3

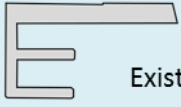
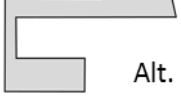
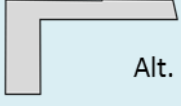

A continuous marginal quay wall is the most efficient configuration for modern container and bulk cargo handling. Therefore, an alternative was explored that expanded the existing configuration. Alternative 3 expands the West Quay to create a series of contiguous berths that would handle multiple commercial and DoD operations. This construction could be phased to track a growing need for berthing and cargo handling area.

Figure 6-4: Marine Terminal Alternative 3



While Alternative 3 allows the most flexibility for berthing and vessel operations it also is the most disruptive to the existing Small Boat Harbor and would require relocation and reconstruction of those facilities and other non-commercial uses. If the Northwest Breakwater is not reconstructed, Alternative 3 would also leave the marine terminal berthing area exposed to waves from that direction. Additionally, Alternative 3 would require extensive dredging and filling along the western shoreline and be the most environmentally impactful of the three Alternatives.

### 6.1.2. Alternatives Evaluation

Alternative	Advantages	Limitations
 <p>Existing</p>	<ul style="list-style-type: none"> <li>• Lowest cost alternative</li> <li>• Sufficient berth length for current uses</li> <li>• Low environmental impacts</li> </ul>	<ul style="list-style-type: none"> <li>• Will not support increased military uses</li> <li>• Finger piers will continue to degrade</li> <li>• Does not allow efficient use of Berth 1</li> </ul>
 <p>Alt. 1</p>	<ul style="list-style-type: none"> <li>• Provides detached military operating area</li> <li>• Could move ammunition and fuel transfer away from hotel and other users</li> <li>• Retains current commercial port configuration</li> </ul>	<ul style="list-style-type: none"> <li>• Higher cost alternative</li> <li>• Expansion area difficult to construct in phases</li> <li>• Could constrain small boat harbor traffic</li> </ul>
 <p>Alt. 2</p>	<ul style="list-style-type: none"> <li>• Lower cost alternative than Alternative 1 that also includes expansion</li> <li>• Could move military and fuel transfer farther away from proposed hotel and other users</li> <li>• Simple configuration that allows more flexible use</li> </ul>	<ul style="list-style-type: none"> <li>• Military uses could encroach on and conflict with small boat harbor</li> <li>• Eliminates much of Berth 1</li> <li>• Requires demolition of both Finger Piers</li> <li>• Difficult to phase in conjunction with North Quay reconstruction.</li> </ul>
 <p>Alt. 3</p>	<ul style="list-style-type: none"> <li>• Provides most flexible configuration for alternative uses</li> <li>• Flexible construction phasing</li> <li>• Expansion to the west allows future use of vacant back lands</li> <li>• Ability to move commercial and military activities farther away from proposed hotel</li> </ul>	<ul style="list-style-type: none"> <li>• Requires complete relocation of Small Boat Harbor and public use areas</li> <li>• Requires extensive fill and dredging</li> <li>• Requires complete demolition of Connecting Pier and Finger Piers</li> <li>• Exposes marine terminal to wave action from the northwest</li> <li>• Most environmentally impactful alternative</li> </ul>

Regardless of the alternative chosen, the North Quay requires improvement and reconstruction. All of the alternatives considered the cost of rebuilding Berths 1, 2 and 3 as well as improvements to the back lands and associated CPA facilities. Navigation improvements associated with reconstruction of the North Quay could include deeper channels and berth area as well as repair of the Tinian Harbor breakwaters.

The Existing Alternative would not include rehabilitation or improvements to the Finger Piers or the Connecting Pier. With Finger Pier A obstructing Berth 1, full use of the North Quay could not be achieved. The Existing Alternative also does not accommodate increased military calls at Tinian Harbor without adversely affecting terminal operations. Therefore, this alternative is not recommended.

Alternative 3, with its contiguous marginal wharf, is attractive from an operational point of view and allows a sequential development from east to west that would preserve and upgrade the existing terminal facilities in advance of the expansion. However, the impacts to other, non-commercial uses, as well as the environmental impacts combine to make Alternative 3 less attractive. Therefore, this alternative is not recommended.

Alternative 1 and Alternative 2 both offer expanded terminal capacity and the possibility of a detached military operating area. Alternative 2 is the lower cost development, using much of the existing Connecting Pier and expanding east along Berth 1. However, it would be difficult to phase the development with the quay wall

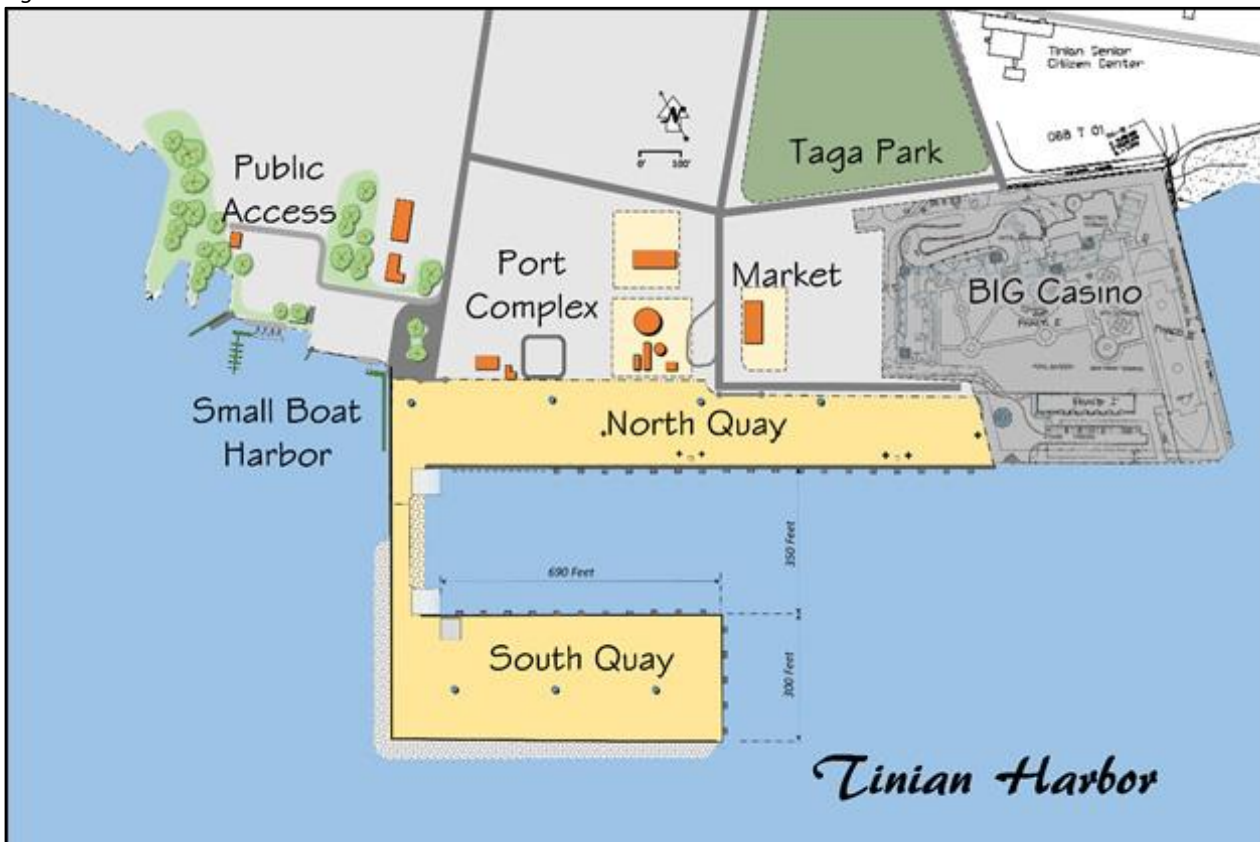
reconstruction, and it does not have as much potential capacity as Alternative 1. Any early improvements at Berth 1 would be “buried” when the West Quay expansion took place. Therefore, Alternative 2 is not as attractive as Alternative 1.

From a commercial need perspective, only the existing North Quay berths are required to support the Tinian economy. Expansion such as Alternative 1 or Alternative 2 would not be needed unless increased military vessel calls and longer times in port displaced civilian uses. Therefore, Alternative 1 is recommended as the preferred development, as construction of the expansion area can be deferred until a specific need and funding source is identified. If only the North Quay is improved, Alternative 1 can also be the most cost-effective and allows CPA to phase its master plan development as needed and as funding is available.

## 6.2. Recommended Harbor Berthing Improvements

The recommended plan as shown in Figure 6-5 and Figure 6-6 features a new South Quay with new deep-water berths that can accommodate a variety of military and commercial vessels, as well as a smaller berth for the EPF type vessels. This plan includes two liquid fuel berths at the North Quay, a Ro-Ro ramp for ferry landing at Berth 1, and a second Ro-Ro ramp for military vessels at the South Quay. These features are described in more detail in the following sections.

Figure 6-5: Recommended Port Master Plan



Full build-out of the Master Plan for the Tinian Harbor waterfront facilities would include reconstruction and fendering of the entire length of the North Quay that includes the following features:

- Reconstruct the entire North Quay wall with sufficient pile depth and tie-back capacity to support a 600 psf working deck load with a 32 foot design berth depth.



- Foam filled fenders on all of Berth 2 and Berth 3, plus 200 feet of Berth 1.
- A 250 foot barge and ferry berthing area with vertical fenders at Berth 1 suitable for smaller vessels with varying freeboard and mooring requirements.
- A secondary tanker manifold at Berth 3 that includes adequate mooring bollards, safety equipment, and spill retention features.
- A Ro-Ro ramp for vehicle ferries, landing craft, and occasional military use at the North Quay.
- Repair and revetment of the existing Connecting Pier.
- A new 800 foot by 300 foot (5.5 acre) South Quay with one deep water berth for large military vessels and a smaller berth for lighters and shallow water vessels.
- A Ro-Ro ramp and vessel ramp landing pad designed for military vessels at the South Quay.

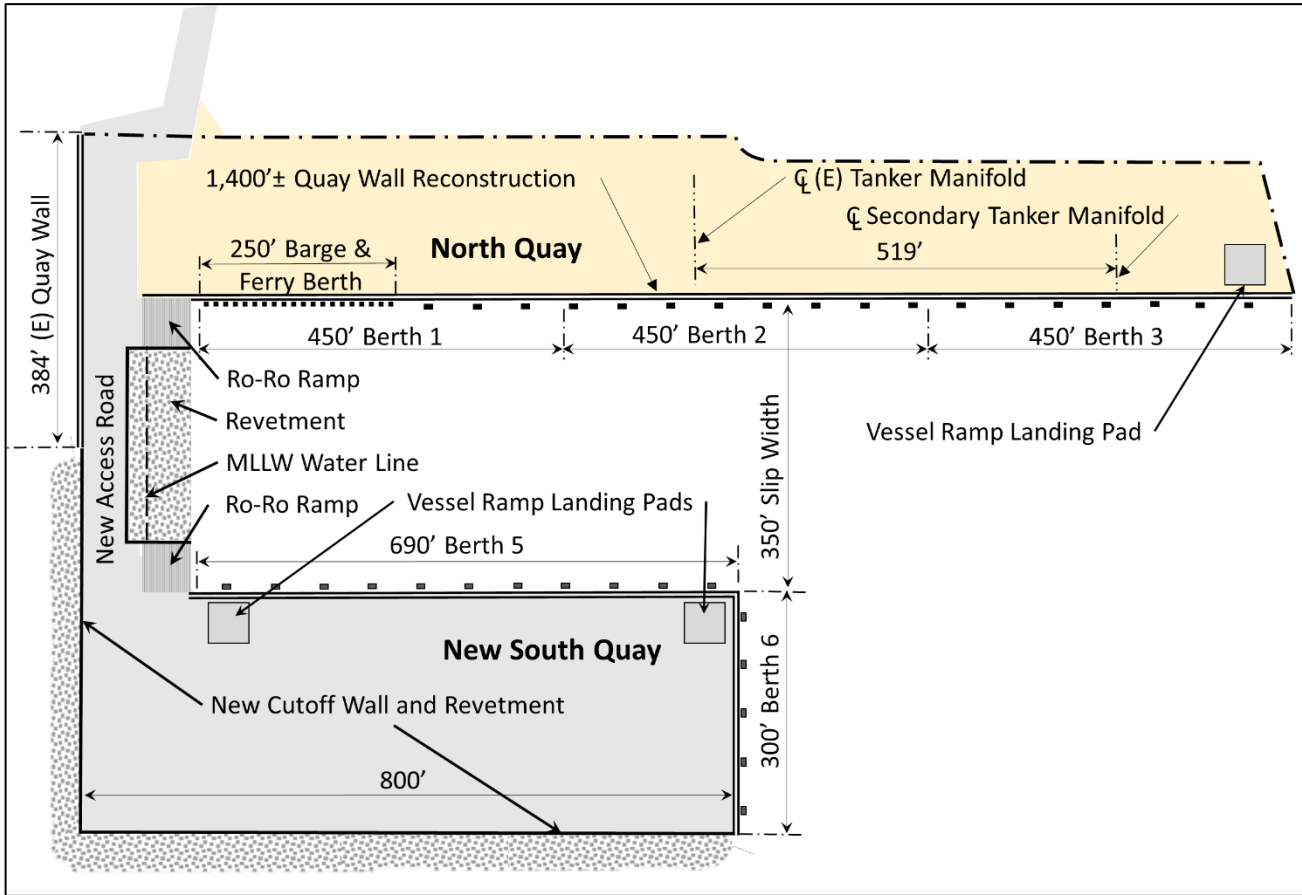
Figure 6-6 shows the general arrangement of these improvements. The concept is to create a flexible terminal layout that can be used for both military and commercial vessel calls. In practice, the new South Quay could be dedicated to military exercises when needed. Since it is isolated from the North Quay and the public hotel, casino and small vessel uses, the military could maintain a higher level of security at the South Quay.

Berth 1 is configured to take passenger and vehicle ferries, landing craft, and container barges. The fendering on Berth 1 will be oriented vertically to allow a variety of vessel sizes to call. Berth 1 can also be used by military transport vessels with bow or stern Ro-Ro ramps.

Berth 3 of the North Quay will have a secondary liquid fuel manifold for use when Berth 2 is not available. It will also have a reinforced landing pad for a Ro-Ro vessel quartering stern ramp that can be used when Berth 5 is not available.

Berth 5 of the South Quay is designed as a pile supported platform that can be dredged to a greater depth than a sheet pile quay wall.

Figure 6-6: Port Master Plan General Arrangement



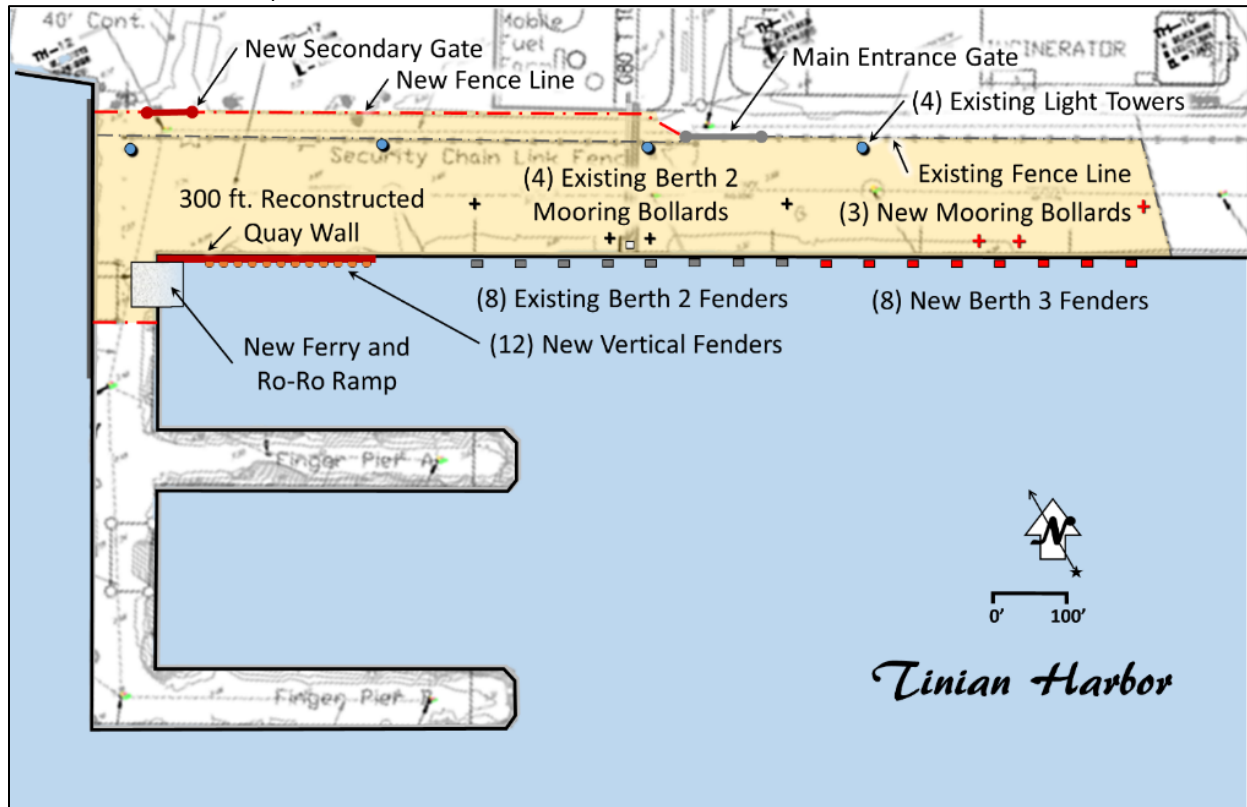
### 6.2.1. Phasing Plan

#### Phase 1

Phase 1 as illustrated in Figure 6-7 represents the initial port improvements that should be made as soon as possible. These improvements will increase the utility of the Tinian Harbor commercial port and prepare the port for the projected calls by larger vessels. On the water side, the most important improvement will be adding fenders and mooring bollards at Berth 3 so that cargo can be unloaded from larger ships while Berth 2 is in use by tankers delivering fuel. Eight new foam-filled fenders will create a total of 1,000 feet of berthing along Berth 2 and 3. Three new bollards will be installed at Berth 3 in a similar pattern to those at Berth 2 to create a secondary cargo and tanker berth.

The initial phase of quay wall reconstruction will take place at Berth 1, with 300 feet of new sheet pile wall and concrete cap installed starting at the connecting pier. The design depth of the initial Berth 1 wall does not have to be more than the existing -28 feet MLLW, as it is intended for shallow draft vessels. However, the cap and paved area must have at least a 600 pound/square foot bearing capacity to support the port's mobile crane. In conjunction with the wall construction, a new Ro-Ro ramp will be built to extend from the Connecting Pier along Berth 1.

Figure 6-7: Phase 1 Berth Improvements



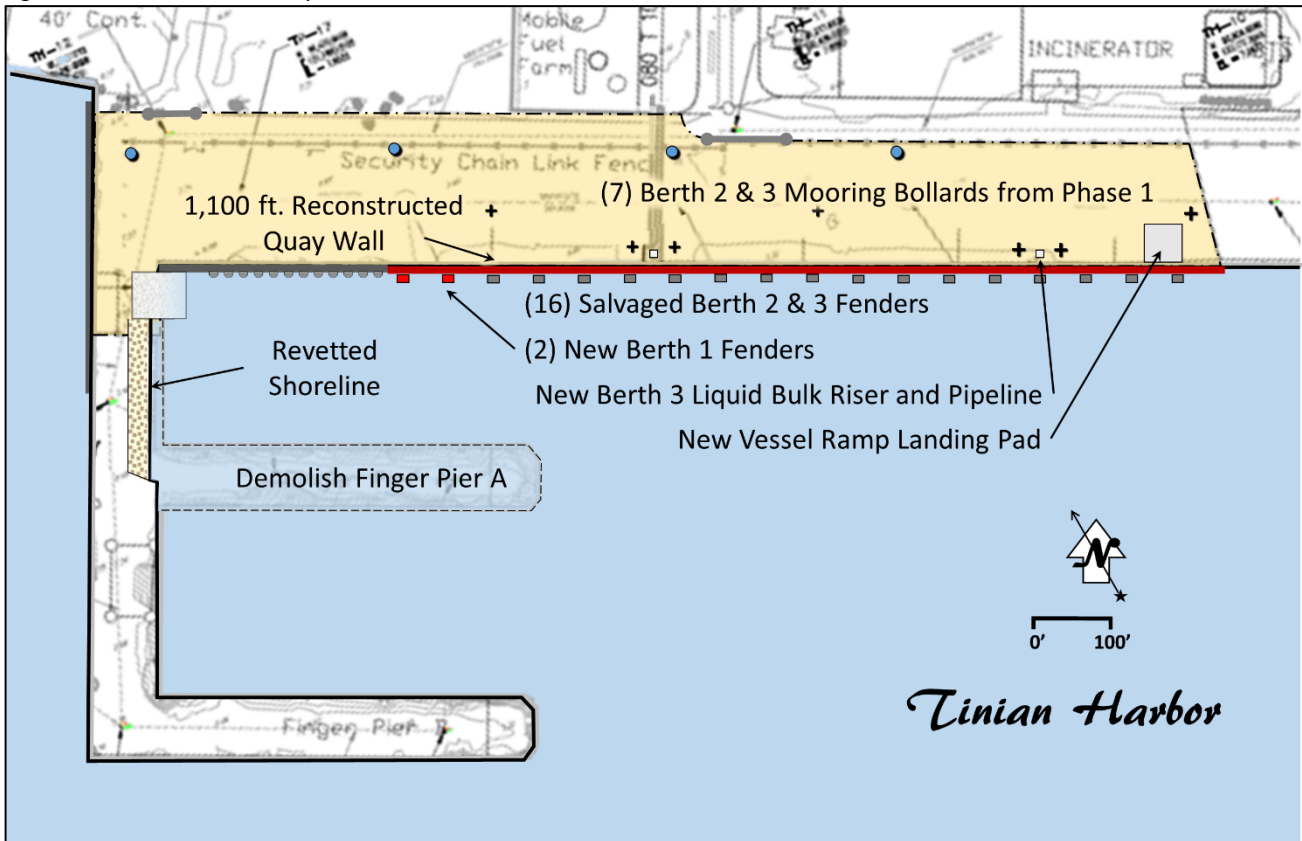
With the Ro-Ro ramp available at Berth 1, the remainder of the Connecting Pier along with both Finger Piers would be closed to further use. In addition, the upland area is cleared of non-essential fencing and damaged portions of the Berth 1 pavement will be razed and repaved. Soil and vegetation is cleared from operations areas along the wharf, and high-mast lighting is repaired to allow night operations.

As part of Phase 1, the northwest fence line is moved approximately 40 feet north to enclose the road that currently connects Canal Street with the public marina area. This will allow the new tree-snake confinement area to become part of the secure marine terminal and will connect the new Port Administration Center with the terminal. In the future, more of the CPA owned backlands in this area can be developed for port uses. Future expansion and circulation recommendations are described in Section 6.4, *Port Authority Upland Development*.

## Phase 2

Phase 2 of the Tinian Harbor development is shown in Figure 6-8. This phase is focused on replacement of the existing sheet pile quay wall. When harbor dredging is performed to deepen the berths, a new quay wall will be needed to support the increased span between the concrete cap and the lower line of embedment in the harbor bottom. The recent condition assessment revealed extensive corrosion along the underwater portions of the wall, as can be expected of a 70+ year-old structure. Repairs to the concrete cap at Berth 2 and Berth 3 have significantly extended the life of this structure, but ongoing decay of the underlying foundation will eventually compromise the integrity of the North Quay.

Figure 6-8: Phase 2 Berth Improvements



The initial stage of reconstruction would begin at Berth 3. The tanker mooring at Berth 2 and the cargo/ferry operation at Berth 1 would remain in use to sustain the cargo needs of the island. As part of the reconstruction of Berth 3, a secondary tanker fuel manifold and buried pipeline would be installed, similar to that at Berth 2. This will allow tanker calls at Tinian Harbor Berth 3 while Berth 2 is under reconstruction, and later when larger vessels are blocking access to the Berth 2 fuel manifold. The deck pavement at Berth 3 will be replaced behind the wharf after repair of the quay wall, and a spill retention system will be installed around the new riser. Along with new deck pavement, Berth 3 will require a hardened landing pad for the stern-ramp of a military EPF ship.

Following completion of Berth 3 reconstruction, the Berth 2 quay wall and approximately 150 feet of Berth 1 will be rebuilt. The existing foam-filled cylindrical fenders at Berth 2 and Berth 3 can be salvaged and re-installed on the new quay wall face. Two new fenders at Berth 1 will complete the project, yielding 1,100 feet of contiguous marginal wharf for dry cargo, liquid bulk, cruise ships, and military use.

To achieve full utilization of Berth 1 and Berth 2, the remaining portions of Finger Pier A must be removed and fugitive fill material removed from the berthing area. Much or all of this work can be carried out from the land using a clamshell excavator and a vibratory pile extractor. Extraction of the steel sheet piles will be necessary to ensure this area can be dredged in Phase 3.

With Finger Pier A removed, approximately 250 feet of the Connecting Pier eastern wall will also need improvement. As this will never be used as berthing face, the deteriorated sheet pile can be cut off at the water line, and sloping revetment constructed to prevent further collapse of the filled structure. A 2:1 slope from +9.0 to -28.0 would leave approximately 50 feet of roadway at the top of the connecting pier, more than enough for two wide traffic lanes, a pedestrian way, and utilities.

### Phase 3

For the 20-year duration of the planning period, the Phase 2 improvements will provide all of the commercial harbor needs for Tinian. Coupled with upland improvements and public waterfront development, the CPA properties have a potential to support almost any reasonable commercial activity on the island.

However, the U.S. Department of Defense is expected to expand use of its 14,000+ acres of military reservation on Tinian. This will likely result in an increased frequency of military vessel calls and perhaps a need for larger vessels with greater depth requirements than can be currently accommodated at the North Quay commercial berths.

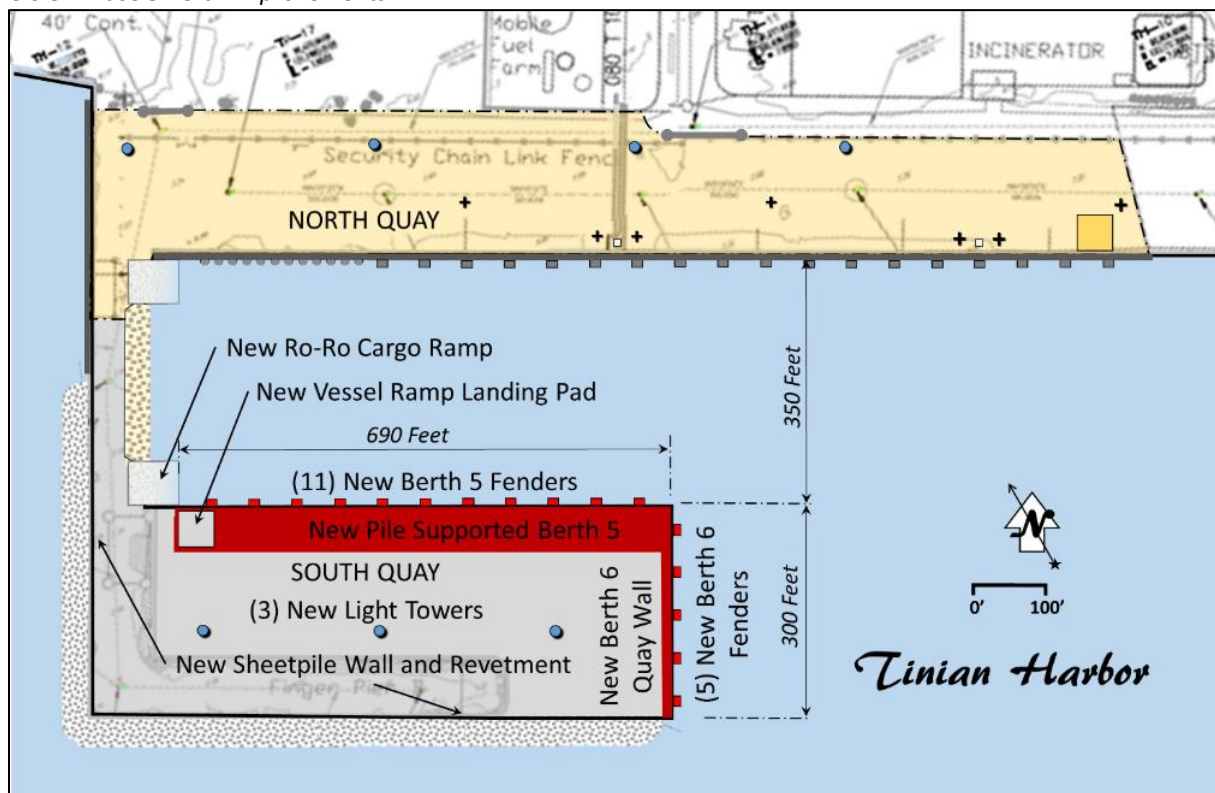
Phase 3, as illustrated in Figure 6-9 embeds the existing Finger Pier B and a portion of the Connecting Pier into a 5.5 acre island, or South Quay. The new reclamation will be 800 feet long and 300 feet wide, including the area of the existing piers, but the land area will not extend south or west significantly farther than the present line of sheet pile. The west and south sides of the South Quay will consist of a short curtain wall with revetment at the foot to prevent scour.

The primary mooring area will be a new, 690 foot Berth 5 constructed along the north side of the reclamation area. This berth will be constructed as a 50 foot wide, pile supported platform that would be engineered to stand a future dredged depth of up to -42 feet MLLW. In addition, a new 300 foot Berth 6 will be constructed on the east end of the South Quay to accommodate smaller vessels and lighters. If the bow of the EPF is allowed to hang beyond the end of Berth 6, then it too could berth there.

The South Quay will have its own Ro-Ro ramp for bow-loading vessels such as the Lightning, and a vessel ramp landing pad for the EPF class vessels. At 42 feet of depth, Berth 5 could accommodate most of the medium sized MSC Ro-Ro and cargo vessels currently in use. However, simultaneous calls by two large vessels would require use of one of the North Quay commercial berths.

The South Quay will require three illumination towers as well as site utilities. A small operations building will also be needed to provide support for the terminal labor.

Figure 6-9: Phase 3 Berth Improvements



### 6.2.2. Structural Repair Recommendation

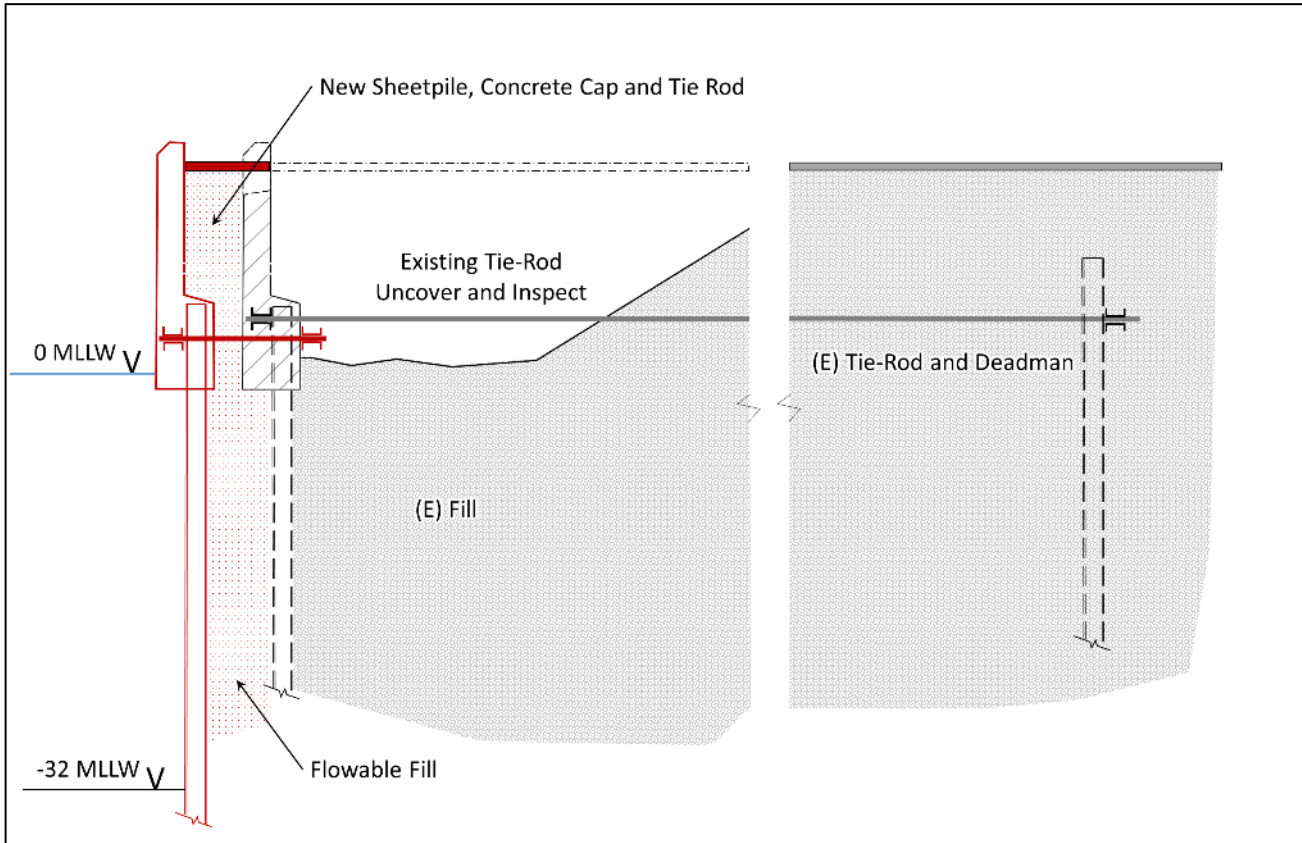
Much of the sheetpile bulkhead making up Tinian Harbor has markedly deteriorated since its construction in 1945. The Finger Piers and the BIG Casino portions of North Quay Berth 4 and the East Quay are beyond repair. Berths 1 through 3 show more moderate deterioration and may be reinforced to extend their service life.

A new sheetpile bulkhead in front of the existing one, joined by a tie-rod, is probably the most cost-effective repair. This bulkhead replacement method can be employed if the existing bulkhead is only moderately deteriorated, and the structure is still stable. Deterioration of the existing Tinian North Quay bulkhead was evaluated in 2015<sup>17</sup>. It was determined that the sheets have lost approximately 25% of their section in most places and that the structure, while stable, was no longer able to support the design loads. It was also determined that the North Quay berths were vulnerable to failure during a seismic event.

Although the sheetpiles below the concrete cap and above the mud-line showed section loss, the buried tie-rods and anchor wall are expected to be in good condition. This is due to the soil embedment and anoxic conditions normally found behind a filled structure. If this is found to be the case by a structural investigation prior to detailed design, the new bulkhead could be attached to the existing waler and tie-backs without replacing the entire structure. Should additional tie-rods be necessary to address deteriorated existing tie-rods of the bulkhead, they can be installed by drilling from the water-side and using grouted anchors at each tie rod. Figure 6-10 shows the schematic section for the proposed repair.

<sup>17</sup> M&N; Assessment of Tinian Harbor; May 2015

Figure 6-10: Recommended Bulkhead Repair



### 6.2.3. Phased Construction Costs

A rough order of magnitude (ROM) construction cost estimate has been prepared for the waterfront construction and minor landside improvements. This ROM estimate is based on similar projects in Guam and Hawaii, as well as costs derived from previous studies. For this master plan level of design, only the elements described in the phasing plan were included in this ROM estimate. Figure 6-11 shows graphically the relative cost breakdown by major construction elements.

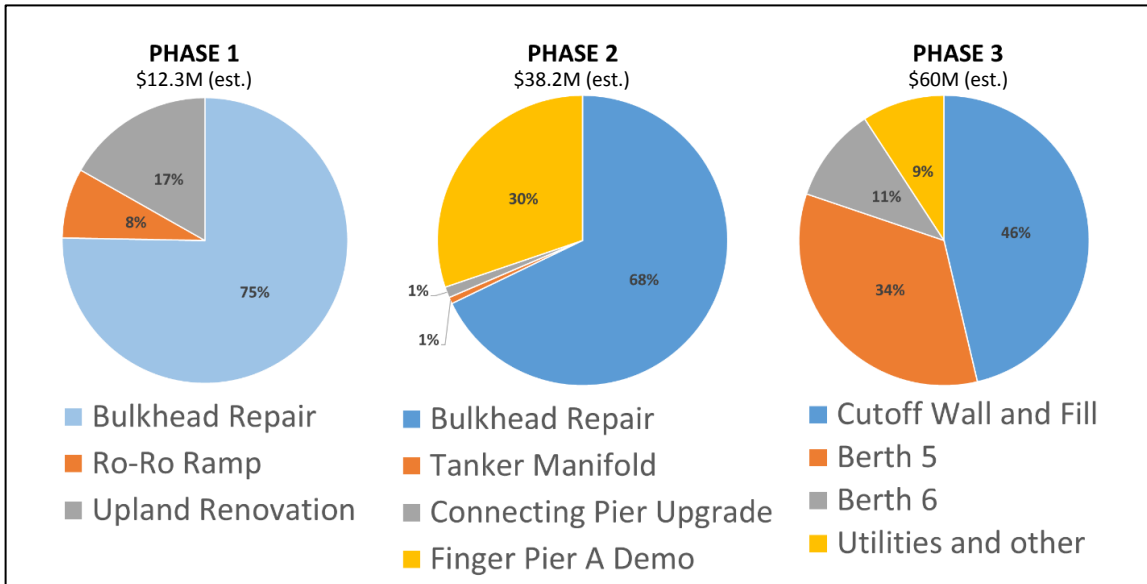
Breakwater and dredging estimates were taken directly from the 2015 *Tinian Harbor Condition Assessment and Breakwater Alternatives Evaluation*. The breakwater preliminary cost estimate is \$82.5 million. Of this, as much as \$21 million could be the CPA's local contribution. Upland improvements and improvements to the Small Boat Marina are advisory and discretionary only. Therefore, it is not possible to develop a cost estimate or to determine where these projects would occur in an overall phasing plan.

**Phase 1** – The majority of construction cost in Phase 1 comes from renovating Berth 1 and providing a Ro-Ro ferry and cargo landing point on the Connecting Pier. The total ROM estimate including overhead, mobilization, contingency, environmental mitigation, and permitting is U.S. \$12.3 million (all ROM estimates provided in 2016 U.S. dollars).

**Phase 2** – Phase 2 consists mostly of bulkhead reconstruction at Berths 2 and 3. It also includes removal of Finger Pier A, but does not include maintenance, or new dredging in Tinian Harbor. The total estimated cost for Phase 2 is U.S. \$38.2 million.

**Phase 3** – If Phase 3 is needed in the future, the overall design and layout will likely change to suit the need at that time. However, a rough estimate was prepared for comparison and planning purposes. In Phase 3, almost half of the cost is in reclamation and wharf construction to create the South Quay. A third of the cost is in the pile-supported Berth 5. This cost could be reduced if a tied-back quay-wall were constructed. However, the quay-wall could not be dredged as deep as the pile supported wharf. In its current conceptual form the ROM cost of Phase 3 is estimated at U.S. \$60.6 million.

Figure 6-11: Construction Cost Breakdown



### 6.3. Dredging, Breakwater, and Navigation Improvements

#### 6.3.1. Future Dredging Requirements

The initial harbor design dredge depth for the 1945 construction was 28 feet within the harbor and 35 feet in the approach channel. The most recent design depth for Tinian Harbor is reported to be 26 feet in the basin and 30 feet in the channel. Currently, the U.S. Army Corps of Engineers is considering new dredging at Tinian Harbor in conjunction with reconstruction of the breakwater. Dredge depths under consideration for this project, recommended by the 1997 Tinian Harbor Master Plan are 30 feet *MSL* inside the harbor, and 33 feet *MSL* in the entrance channel. This corresponds to approximately 29 feet *MLLW* and 32 feet *MLLW*, respectively<sup>18</sup>.

Vessels approaching Berth 4 have grounded in the past and larger vessels such as the Mobil tankers, arrive light-loaded to maintain adequate underkeel clearance (usually about 3 feet). Shoaling within the harbor has been found to occur primarily along the deteriorated quay walls and likely consists of lost fill material rather than current driven sediment. Therefore, the primary area in need of dredging is the North Quay Berth 4, where removal of as much as 30 feet of material may be required to restore the design dredged depth. The south margin of the turning basin and southwest margin of the inner entrance channel also have some shoaling that should be dredged. According to the latest Corps estimates, the computed maintenance dredge quantity is 33,784 cubic yards to achieve the 1997 recommended depths.

Fully-laden draft for many of the design vessels presently calling at Tinian Harbor is 25 feet to 26 feet. Since this is near the current depth in many parts of the harbor, these ships arrive light in order to maintain at least a

<sup>18</sup> See Section 3.3.2 for discussion of tidal datum elevations



three-foot underkeel clearance. Therefore, 29 feet below mean lower low water is the minimum depth that should be considered for inner harbor dredging. This applies particularly to cruise ships that do not have the option of sailing under “light” loading conditions.

In addition, the Department of Defense has requested that the Corps investigate channel alternatives up to -42 feet MLLW in order to accommodate future fuel tankers and large military supply vessels. It should be noted that the current North Quay was designed for a -28 foot depth and in its current condition, may not support any maintenance dredging below -26 feet.

Since efficient future use of Tinian Harbor will depend on having deeper water at the berth and mooring areas, this Master Plan recommends that future dredging be designed to no less than -29 feet MLLW. Further, it recommends that structural improvements at the North Quay be designed to support no less than -32 feet MLLW in the berth area to accommodate future deeper vessels and to allow 3.0 feet of overdredging. If the U.S. military requires deeper berth depth, then the new South Quay can be designed as a pile supported wharf at Berth 5 that will provide the -42 feet of depth the DoD may desire for its vessels.

### **6.3.2. Breakwater Reconstruction<sup>19</sup>**

The existing Tinian Harbor breakwater is severely degraded and beyond repair leaving the inner harbor exposed to the approach of large deepwater ocean swell and severe typhoon storm waves. If Tinian Harbor is to remain usable for commercial and military vessels, the breakwater must be reconstructed before further degradation results in damage to port facilities.

The replacement breakwater should be designed for the 50-year return period wave event coupled with a nearshore water level rise associated with the nearby passage of a typhoon. As steel sheetpile has a limited lifespan in salt water, a conventional rubble mound breakwater structure is recommended, with the existing sheet pile caisson remnants being incorporated into the core of the new breakwater.

Concrete armor units are recommended for the Tinian breakwater, as adequate armor stone may not be available on-island. These precast concrete units have the ability to withstand wave attack and can be smaller than the required stone size for a given wave height. Tribar concrete armor units have been used with considerable success for projects with design conditions similar to Tinian Harbor, and are recommended as an alternative to stone armor.

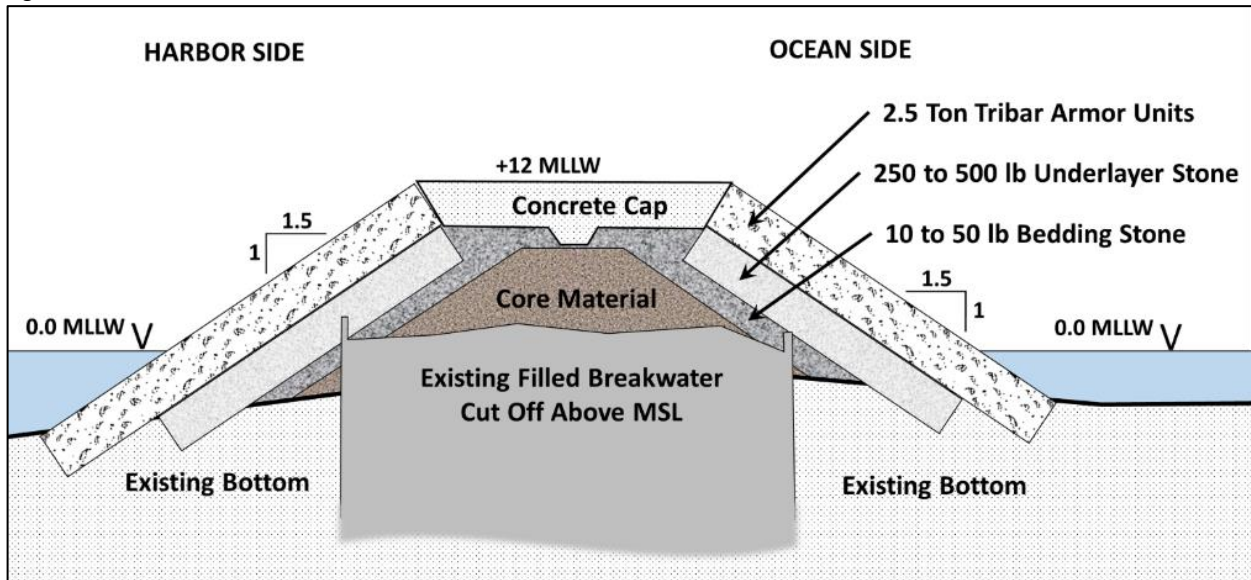
A breakwater crest elevation of +12 feet would prevent overtopping during typically-occurring non-typhoon wave events. Over-topping of the breakwater during typhoon conditions could be allowed, provided the structure is designed to withstand overtopping forces. This requires tribar armor on the inner side of the breakwater as well as the sea-facing side. Ocean-going vessels would need to leave a harbor in the event of a typhoon and ride out the storm at sea if overtopping occurs. Smaller vessels, such as tugs, ferries, and fishing boats would have to find a harbor of refuge on Saipan or Guam.

Rubble mound structures are composed of a compacted fill material core, covered by a bedding layer, an under layer of stone, and an armor layer. The new breakwater would follow the alignment of the existing breakwater, and would utilize the remnants of the existing breakwater as a portion of the core. Remnants extending above +3 feet would be removed so as to not protrude into the new breakwater stone layers. Figure 6-12 is a schematic of such a breakwater.

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<sup>19</sup> U.S. Army Corps of Engineers; *Tinian Harbor Condition Assessment and Breakwater Alternatives Evaluation*; July 2015

Figure 6-12: Schematic Breakwater Section



Data Source: Corps of Engineers, Drawing M&N

### 6.3.3. Other Navigation Improvements

When the Corps replaces the Tinian Harbor breakwater, local users have asked that a new small boat harbor entrance and navigation channel be included through the northwest portion of the new breakwater. This channel would improve water circulation within the enclosed harbor and allow small boat traffic to bypass the commercial harbor.

Furthermore, Marine Corps supply ships presently arriving in Tinian are chartered vessels which do not require a security zone. However, military vessels often require a security radius and sensitive military ships may call in the future. It has been reported that military ships at Tinian Harbor have restricted small boat access in the past so a bypass would enable small boats to avoid military harbor activities.

In conjunction with dredging and breakwater repair, the outer and inner reach of the entrance channel should be provided with on-shore radar-reflective range markers to allow vessel approach and departure during times of reduced visibility. In addition, the U.S. Coast Guard should review all illumination plans for the nearby BIG casino and hotel development to ensure that it does not interfere with nighttime vessel movement. The master plan also recommends that the CPA consider a full-time tug at the harbor for vessel-assist if justified by frequent calls from larger vessels and to evacuate the harbor under typhoon conditions since a tug from Saipan may not be available under such circumstances.

### 6.3.4. Breakwater Construction and Dredging Costs

The U.S. Army Corps of Engineers is evaluating several alternatives for breakwater repair at Tinian Harbor. At this time, their recommendation is for a rubble-mound structure to replace the existing deteriorated sheet piles. The Corps' recommended plan is to replace both the Main Breakwater and the Northwest Breakwater in one project. This would allow the constructor to drive on the breakwater and do much of the work from the dry. The following construction and dredging costs were developed in the Corps' July 2015 *Tinian Harbor Condition Assessment and Breakwater Alternatives Evaluation*. As this work is expected to be funded by the U.S. government, these costs are not included in the rough order of magnitude (ROM) cost estimates for berth and upland developments and therefore, financial analysis.

- The estimated ROM cost to rebuild the entire 3,500 linear feet of main breakwater, plus the 1,100 feet of Northwest Breakwater is \$82.5 million.
- Maintenance dredging of the existing channel to -32 feet MLLW and the harbor turning basin to -29 feet MLLW is estimated to require removal of 33,800 cubic yards of material at a cost of \$4.8 million.
- Additional dredging to provide a new 1-lane northwest channel to the small boat harbor is estimated to cost \$4.9 million, and a 2-lane channel is \$7.0 million.

These ROM estimates represent construction cost only. They do not include real estate cost, plans and specifications development, contract administration, engineering during construction, construction administration, mitigation/ environmental permits, escalation or contingency.

## 6.4. Ports Authority Upland Development

### 6.4.1. Key Drivers

Commonwealth Ports Authority controls approximately 73 acres of land that were ceded to the CNMI and not leased back to the U.S. Government. This land includes the harbor area and working berths, the breakwater, and a large parcel of land south of the San Jose municipality. Control of this land has largely prevented encroachment by commercial and residential uses. However, a five-acre parcel was recently leased to BIG for hotel and casino development within the marine terminal operating area. Additionally, a seawater pumping station, and an Air Force fuel depot have been proposed directly adjacent to the North Quay. Therefore, a comprehensive plan for future upland development is crucial to preventing future constriction of port operations. The following key drivers of upland development are recommended:

1. **Water Dependent Use** – Any land directly adjacent to the marine terminal must be reserved for uses that are related to cargo handling or other uses that require waterfront access. Warehousing, tankage, maintenance and other functions that can take place near the port but away from the water must be located farther inland.
2. **Public Access and Circulation** – Tinian residents need a safe and effective facility for recreation, subsistence fishing and small boat storage. Such uses are water dependent, but cannot limit the marine terminal activities.
3. **Passenger Access and Port Security** – Ferries and cruise ships will generate passenger traffic that must be separated from the port operations area for reasons of security and safety.
4. **Expandability and Flexibility** – Upland areas must include reserve land for future expansion and any use proposed near the port must be flexible to accommodate changing market demand and port needs.

### 6.4.2. Prioritized Land Use

Excluding the BIG Casino leased area, smaller parcels leased to Mobil, Saipan Stevedore Company, Inc., and other enterprises, CPA controls about 57 acres of wharf and backlands. Of that, approximately 45 acres remain for development as near-dock, off-dock and commercial or public uses. Allocating these parcels must follow a priority or level of importance to the CPA.

1. **Highest Priority** – Land that is essential for the current *or future* operations and circulation of the marine terminal.
2. **High Priority** – Land needed for port related commercial and public activities that do not have to be on the marine terminal.
3. **Medium Priority** – Land that can be used to enhance the tourism and other commercial potential of Tinian or can otherwise generate economic growth for the island.

4. **Low Priority** – Land that is too far from the terminal to be used for direct port activities.

Figure 6-13: Land Priority Allocation

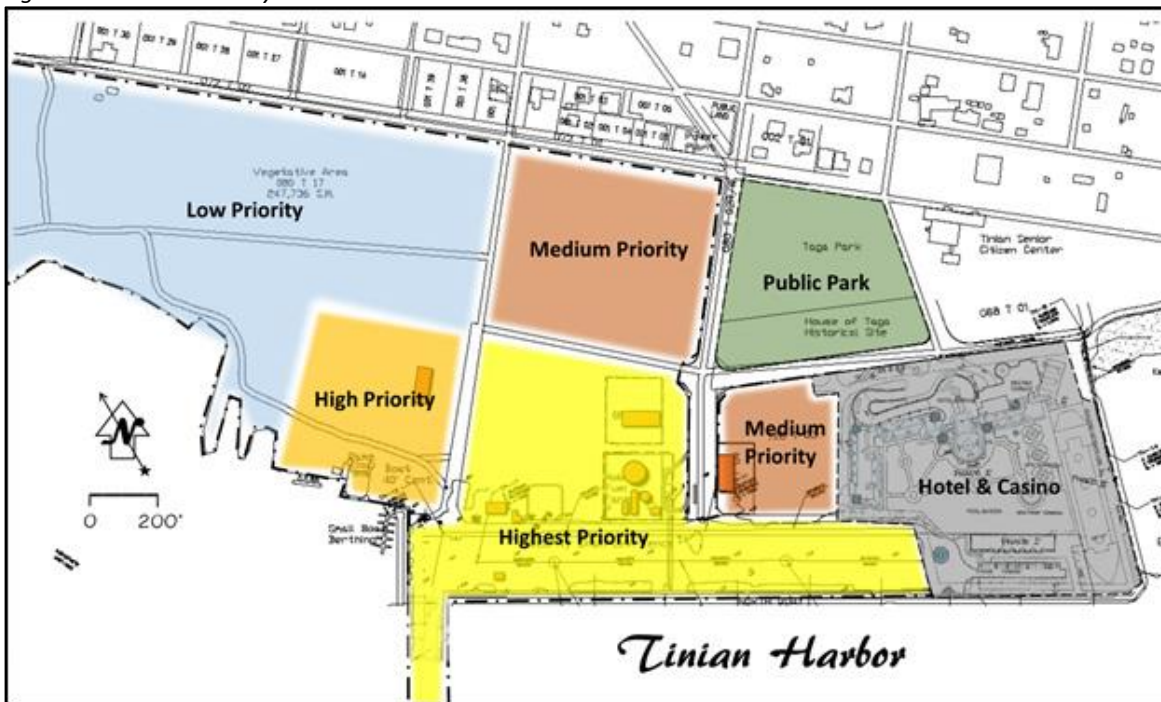


Figure 6-13 illustrates a recommended land priority allocation for the CPA properties at Tinian Harbor. The Highest Priority areas are those with possible direct access to the commercial berths and with uses that are already part of port operations. The land just west of the seaport is given a High Priority designation as it has an established water dependent use for recreation and commercial fishing. The parcel immediately adjacent to the hotel and casino lease would normally be High Priority for port development. However, proximity to the public facilities at Taga Park and the future public use at the casino complex reduces this land’s value for port uses.

### 6.4.3. Recommended Land Use Plan

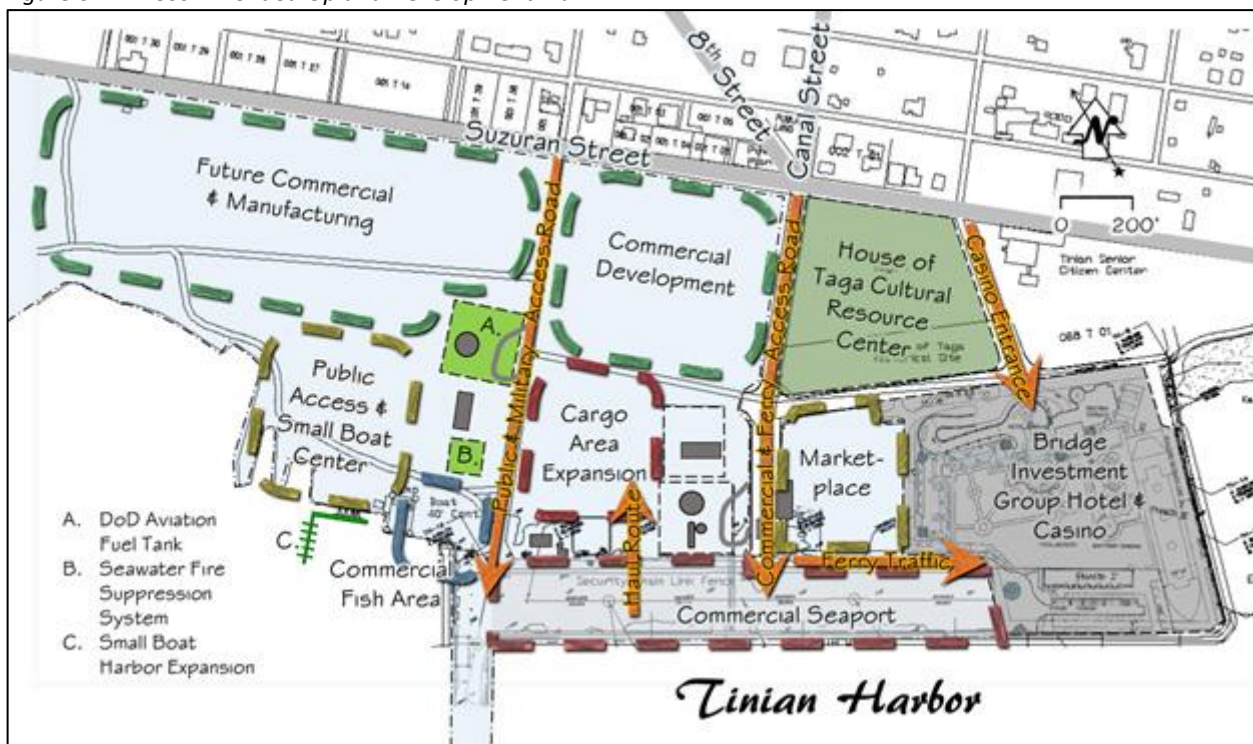
Based on the premise that the CPA should use its land for efficient and safe transfer of cargo and for the economic benefit of Tinian Island residents, a Land Use Plan was developed for all of the CPA properties. While it is not necessary or desirable to develop all of the parcels, this plan provides the necessary expandability and flexibility to allow a variety of future uses.

Figure 6-14 illustrates the recommended upland uses combining projects that are currently under consideration, near term needs identified by stakeholders and residents, along with longer term possible uses that are compatible with the CPA properties. In general order of priority, these upland developments include:

- Combining the new port offices and the brown tree snake interdiction area with the current seaport fenced terminal. This will allow direct access for terminal labor, port management, customs and inspection officials and others with port authorization. It will also open an area to the north of the commercial seaport for future refrigerated warehousing and other value-added cargo activities.
- Constructing the proposed DoD aviation fuel tanks and transfer facility to a site that is farther away from the wharf and farther from the hotel and casino complex. This creates the opportunity in the near term (post-2020) to relocate the Mobil fuel storage facility to the same location and open additional waterfront land to port uses. Should the incineration station be rebuilt, it should be in this same area.

- A seawater fire protection system is needed to support increased tanker calls at Tinian Harbor. This is presently considered for a location near the current Mobil fuel storage tanks. However, by locating it farther to the northwest, it is still near a water source, but does not impede other uses that need to be closer to the port.
- A commercial fish receiving area is needed near the small boat harbor. This should be located near the reconfigured small boat marina as described in Section 6.5 (Figure 6-15, Item “C”).
- Public access enhancements can be located near the existing launch ramp, as well as expansion and improvement of the small boat marina.
- An open marketplace west of the Bridge Investment Group Hotel and Casino would provide a buffer between commercial port activities and the guest accommodations at the hotel. It would also create an opportunity for local small business to sell directly to island visitors.
- A future commercial development area west of the House of Taga Center would be within a short walk of the hotel and casino complex, providing an opportunity to develop high-end retail outlets and restaurants.
- Finally, expanded commercial or retail needs on Tinian could be developed south of Suzuran Street on the CPA property located in the low and medium priority property.
- A leasing policy should be developed that outlines the above to guide CPA administrative decisions. Lease uses, duration, compensation, and public disclosure policies and procedures will ensure consistent and transparent property decisions.

Figure 6-14: Recommended Upland Development Plan



## 6.5. Public and Recreational Uses

### 6.5.1. Public Use Areas

The existing public launch ramp and marina provide a very popular and important resource at Tinian Harbor. However, the overall facility lacks basic amenities such as restrooms, picnic areas, fish-cleaning areas and other necessary infrastructure. For this area to properly support local fishing and recreational boating, it should have the following improvements:

- **Public Restrooms** – Restroom would make this facility more attractive for families and recreational boaters. They would also minimize the discharge of untreated sewage into the harbor and/or nearshore waters (Figure 6-15, Item “F”).
- **Picnic and Recreation Area** – The existing shelter should be augmented with tables, benches and grills located near the boat ramp. In addition, a fish cleaning station would be located adjacent to the boat ramp (Figure 6-15, Item “E”).
- **Trailer Parking and Boat Wash-Down** – 25 to 30 paved parking stalls for vehicles, vehicles with trailers, and for boat wash-down is needed near the launch ramp (Figure 6-15, Item “B”).
- **Boat Storage** – A paved and secured area for small boat storage and minor repair could be constructed north of the public use area. This storage facility should be let as a commercial concession to ensure that it is maintained and secured (Figure 6-15, Item “A”).
- **Vehicle Parking** – Paved parking for passenger vehicles and buses is needed near the proposed marginal loading dock. A sufficient number of stalls would be provided to accommodate passengers using the interisland ferry service; charter dive and fishing operations. A limited number of long-term parking stalls could be provided for people living on Saipan and working on Tinian, and people living on Tinian and working on Saipan.

### 6.5.2. Concession Area

A one acre portion of the public area could be let on concession to an operator that would own and run a convenience store for bait, boat parts, picnic supplies and ice (Figure 6-15, Item “C”). The concession operator could also:

- Oversee and maintain the marina and floating docks
- Maintain and operate the restrooms and the pump-out station
- Secure and maintain a boat and trailer storage facility that includes a wash-down area and repair shop
- Have general responsibility for use and condition of the site, including managing parking
- Operate as a fish-buyer and processor distributing to Tinian and local CNMI markets

### 6.5.3. Small Boat Harbor

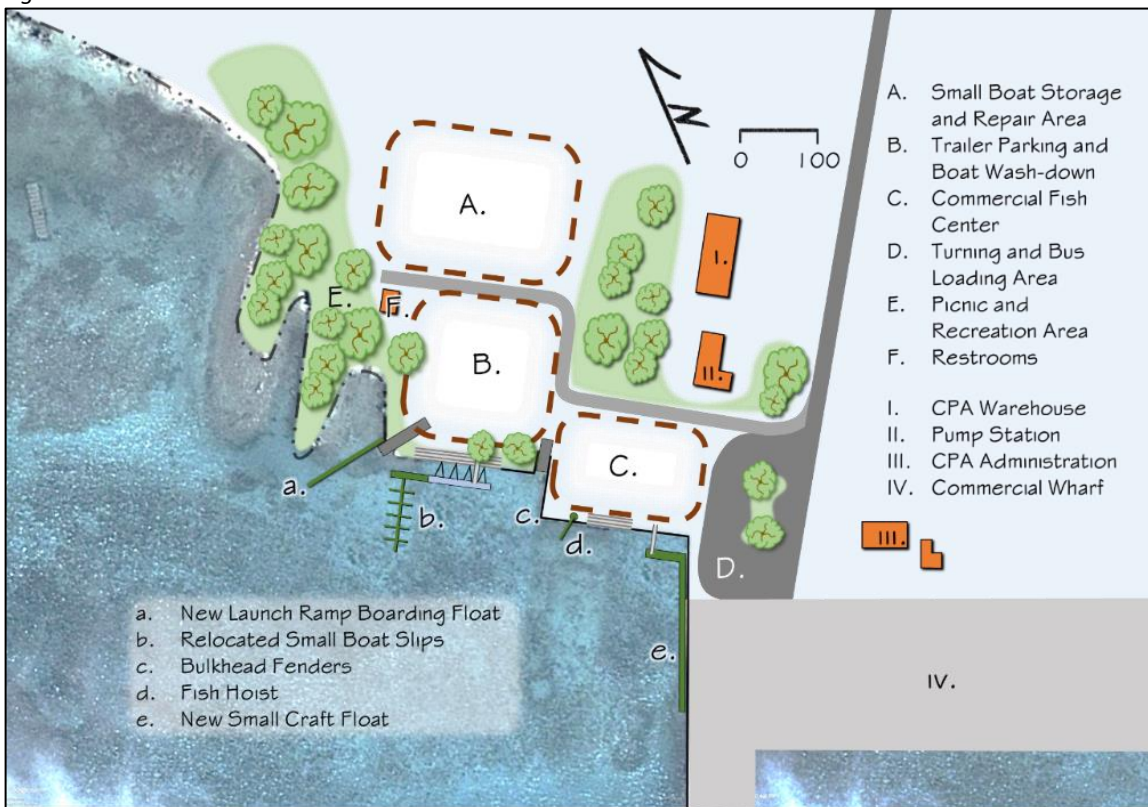
Tinian Harbor includes the only small craft facilities on the island providing access for commercial and recreational vessels. The existing small craft facilities include a floating dock held in place with steel pipe piles; a single lane concrete boat ramp; a barge ramp; paved and unpaved parking for vehicles and vehicles towing trailers; and a floating marginal loading dock held in place with stiff-arm anchorage. These facilities provide mooring for up to 18 small craft vessels; support commercial, recreational and subsistence fishing; and provide a landing for informal trade with Saipan. Improvement of the Small Boat Harbor will not have a lasting benefit until the breakwater can be repaired and seasonal storms do not continue to damage the facilities. Maintenance dredging of the harbor bottom is also needed to maintain access for medium sized fishing vessels and calling

yachts. A separate entrance channel to the small craft facility is currently under consideration by the Corps and would greatly enhance the usability of the harbor. (See Section 6.3.3 Other Navigation Improvements).

Based on the public information meeting held on October 27, 2016, literature research and review of similar facilities, the following improvements (See Figure 6-15) are proposed to enhance the public marina facilities:

- The existing floating dock would be repaired and relocated to provide clearance for vessels mooring on the proposed marginal loading dock. It would be anchored in place with an elastic mooring system instead of the existing steel pipe piles. The floating marginal dock would be expanded to the west to connect with the relocated slips (Figure 6-15, Item “b”).
- A new launch ramp boarding float would be installed adjacent to the existing concrete launch ramp. It will be used to expedite the launching and retrieval process, and to make is safer and more convenient to load and unload passengers (Figure 6-15, Item “a”).
- A new small craft float / multi-use dock would be located alongside the West Quay to provide temporary mooring for boats using the vessel sewage pump-out and/or fish hoist. It could also be used for vessels to be fueled directly from a fuel truck. The existing concrete bulkhead would be repaired and covered with plastic fendering (Figure 6-15, Items “c” and “e”).
- Vessel pump-out on the utility dock will be used by vessels moored in the harbor or by visiting vessels to minimize the discharge of untreated sewage into the harbor and/or nearshore waters.
- A public fish hoist and scale on the utility dock will be used by vessels moored in the harbor or visiting vessels to off load large fish and to weigh fish. It could also be used to off load cargo, boat engines and parts (Figure 6-15, Item “d”).

Figure 6-15: Small Boat Harbor



Source: M&N

## 7.0 Project Permitting and Environmental Mitigation

This section addresses the environmental regulatory laws and regulations that need to be considered to implement the Tinian Harbor Master Plan. It will also focus on sensitive biological issues that will guide project development and mitigation measures, such as federal and CNMI-listed endangered and threatened species, special aquatic sites, and essential fish habitat.

The proposed Master Plan will require permits or authorizations from the following federal and CNMI agencies — the U.S. Army Corps of Engineers (Corps), U.S. Environmental Protection Agency (USEPA), CNMI Division of Coastal Resources Management (DCRM), CNMI Division of Environmental Quality (DEQ), and possibly the CNMI Department of Lands and Natural Resources (DLNR).

Before any permit applications can be submitted for agency review, the federal action agency (assuming the project will be federally funded) must comply with the National Environmental Policy Act (NEPA). NEPA requires that each federal action agency develop documentation supporting a level of review appropriate for the environmental, cultural or socio-economic impacts the project is expected to create. The Tinian Harbor Master Plan will require an Environmental Impact Statement (EIS) or an Environmental Assessment (EA). Although not a permit, the NEPA document will contain much of the information required by various application packages that would be submitted later to federal and CNMI agencies.

The NEPA document is the primary document used in the decision-making process and will provide guidance on final design as well as how the project would be implemented. This document should be completed and approved by the federal action agency prior to submitting applications for specific federal or local permits.

The following discussion focuses on the various environmental and regulatory issues that will play a crucial role in implementing the Tinian Harbor Master Plan.

### 7.1. Biological Environment

#### 7.1.1. Federal and CNMI Protected Species

The Endangered Species Act (ESA) was initially passed by the U.S. Congress in 1973 and has been re-authorized and amended several times. The purpose of the ESA is to conserve “*the ecosystems upon which endangered and threatened species depend,*” and recover listed species. The U.S. Federal Government, under authority of the ESA, protects those wildlife species that have been determined to have dangerously low population levels or are in imminent threat of extinction. Populations of those wildlife species requiring federal protection are either classified as endangered or threatened.

*Endangered* is defined in § 3(6) of the ESA as “...any species [including subspecies or qualifying distinct population segment] which is in danger of extinction throughout all or a significant portion of its range.” A *threatened* species is defined in § 3(19) of the ESA and is defined as “... any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.”

Navigating regulatory requirements associated with the presence of threatened or endangered species can become quite involved, depending upon the magnitude and nature of the proposed action, and the degree to which early planning and scoping was completed. Under Section 9 of the ESA, it is unlawful to “*take*” a threatened or endangered (e.g., listed) species. The term “*take*” is defined by the ESA as “*to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct.*” The term “*harm*” has been further defined to include “*significant habitat modification or degradation.*” The term “*harm*”



may include significant habitat modification that results in the killing or injuring of a listed species through impairment of essential behavior (e.g., nesting or reproduction).

With respect to the proposed Tinian Harbor Master Plan, impacts to protected species will likely be limited to dredge and fill activities related to dock and harbor improvements.

Despite the ESA Section 9 prohibition on “take” of listed species, the ESA does allow under certain circumstances the “take” of listed species provided “take” is incidental to an otherwise authorized action. “Take” authorization is addressed through ESA Sections 7 (Federal inter-agency consultations) or 10 (Incidental Take Permit). Section 7 consultations are limited to actions that have a federal nexus (e.g., federal funding or federal permits) and section 10 Incidental Take Permits are typically issued for private sector actions that have no federal involvement. Project related impacts to federal listed species from activities associated with implementation of the Tinian Harbor Master Plan will be addressed through ESA Section 7 consultation process.

The U.S. Fish and Wildlife Service (USFWS) has currently identified 30 threatened/endangered species within the Commonwealth of the Northern Mariana Islands (CNMI): two mammals, six birds, four reptiles (three marine sea turtles, one skink), three insects, three gastropods, and 12 plants. This list does not include the experimental Guam Rail (*Rallus owstoni*) population on Rota that receives no formal protection under the ESA. General jurisdiction of the USFWS includes terrestrial and freshwater wildlife, while the National Marine Fisheries Service’s (NMFS) primary responsibility is marine wildlife species. Because marine sea turtles have both a terrestrial and pelagic marine component in their life history requirements, ESA enforcement is shared between the USFWS (Department of Interior) and the NMFS (Department of Commerce).

The CNMI Government published a list of threatened and endangered species of the CNMI in 1991 (see CR 13(1) dated 15 January 1991). This original list includes 14 species: two mammals, seven birds, three reptiles, and two plant species. The CNMI does not differentiate between threatened and endangered categories and therefore are jointly classified. Since publication of the original list, only the Tinian Monarch (*Monarcha takatsukasae*), a single island endemic, has been delisted due to recovery. The CNMI threatened/endangered species list contains two species not officially recognized as either threatened or endangered by the Federal Government — the Micronesia Saw-tailed Gecko (*Perochirus ateles*) and Cordon de San Francisco (*Lycopodium phlegmaria* var. *longifolium*). Table 7-1 identifies those species listed by the USFWS and CNMI Government that may occur or have historically occurred on Tinian.

Table 7-1: Threatened/Endangered Species That May Occur or Have Historically Occurred on Tinian

Listed Species	Federal	CNMI
<b>MAMMALS</b>		
Mariana Fruit Bat ( <i>Pteropus m. mariannus</i> )	T	T/E
Pacific Sheath-tailed Bat ( <i>Emballonura semicaudata rotensis</i> )	E	T/E
<b>AVIFAUNA</b>		
Mariana Common Moorhen ( <i>Gallinula chloropus guami</i> )	E	T/E
Micronesian Megapode ( <i>Megapodius l. laperouse</i> )	E	T/E
<b>HERPETOFAUNA</b>		
Mariana Skink ( <i>Emoia slevini</i> )	E	NR
Micronesia Saw-tailed Gecko ( <i>Perochirus ateles</i> )	NR	T/E
Green Sea Turtle ( <i>Chelonia mydas</i> )	T	T/E
Hawksbill Sea Turtle ( <i>Eretmochelys imbricata</i> )	E	T/E
Leatherback Sea Turtle ( <i>Dermochelys coriacea</i> )	E	NR
<b>GASTROPODS</b>		
Humped Tree Snail ( <i>Partula gibba</i> )	E	NR
<b>PLANTS</b>		
Ufa-halomtano ( <i>Heritiera longipetiolata</i> )	E	NR
<i>Dendrobium guamense</i>	T	NR
Berenghenas Halomtano ( <i>Solanum guamense</i> )	E	NR
<i>Tuberolabium guamense</i>	T	NR <sup>20</sup>

Key: E = Endangered, T = Threatened, NR= Not Recognized

### 7.1.1.1. Federal and CNMI Protected Terrestrial Fauna and Flora

The following species accounts are for those ESA and CNMI protected terrestrial species that may occur on Tinian Island. A preliminary effects determination was made based solely on the species' life history and habitat requirements and the potential impacts proposed actions described in the Tinian Harbor Master Plan.

Detailed descriptions of each species and their status on Tinian can be found in Appendix B, Tinian Harbor Master Plan Project Permitting & Environmental Mitigation.

#### **MAMMALS**

##### **Mariana Fruit Bat (*Pteropus m. mariannus*)**

The Mariana Fruit Bat (*Pteropus m. mariannus*) is a medium-sized colonial flying fox that is known to occur on all islands extending northward from Guam to Maug (Wiles et al. 1989b, Johnson 2001, Vogt 2009). No critical habitat has been designated for this subspecies in the CNMI. The Mariana Fruit Bat was afforded threatened/endangered status by the CNMI Government, published in the Commonwealth Register on 15 January 1991. Based on the lack of optimal habitat for this species at Tinian Harbor, a “no effect” determination is anticipated.

##### **Pacific Sheath-tailed Bat (*Emballonura semicaudata rotensis*)**

Four subspecies of the Pacific Sheath-tailed Bat are known from islands distributed throughout Micronesia and Polynesia (Wiles and Brooke 2009). The Pacific Sheath-tailed Bat (*Emballonura semicaudata rotensis*) is the only

<sup>20</sup> Information obtained from USFWS (2011), Liske-Clark (2015), USFWS (2015), and USFWS (2017). Scientific and common names follow USFWS (2011, 2015) (for mammals); Gill and Donsker (2017) (for avifauna); Zug (2013) and USFWS (2017) (for herpetofauna); USFWS (2015) (for gastropods); and Stone (1970) (for plants). T = Threatened, E = Endangered, NR = Not recognized.

insectivorous bat found in the Mariana Islands. Currently, the only remaining population consists of 359–466 individuals on Aguiguan (Wiles et al. 2011, USFWS 2015). The Pacific Sheath-tailed Bat was federally listed as endangered in 2015 (USFWS 2015). No critical habitat has been designated for this subspecies. This subspecies is recognized as threatened/endangered by the CNMI Government. Based on the lack of optimal habitat for this species at Tinian Harbor, a “no effect” determination is anticipated.

## **AVIFAUNA**

### **Mariana Common Moorhen (*Gallinula chloropus guami*)**

The Mariana Common Moorhen (*Gallinula chloropus guami*) is a mostly dark to sooty gray waterbird that is limited to the Mariana archipelago and is presently found on Saipan, Tinian, Rota, and Guam (Takano and Haig 2004a). The Mariana Common Moorhen was listed as endangered by the USFWS on 27 August 1984 (USFWS 1984); no critical habitat has been designated. The CNMI Government also classified this subspecies as threatened/endangered, and included it on the local CNMI list that was published in the Commonwealth Register in 1991.

Current populations are estimated at 100 moorhens on Saipan, 50 on Tinian, less than 10 on Rota, and 100-150 on Guam (USFWS 2012). Based on the lack of optimal habitat for this species at Tinian Harbor, a “no effect” determination is anticipated.

### **Micronesian Megapode (*Megapodius i. laperouse*)**

The Micronesian Megapode is found in the Mariana and Palau Islands and is comprised of two subspecies: *Megapodius i. laperouse*, which occurs in the Mariana Islands, and *Megapodius laperouse senex*, which occurs in the Palau Islands. The Mariana Islands subspecies of the Micronesian Megapode was listed as endangered by the USFWS on 2 June 1970 (USFWS 1970). To date, no critical habitat has been designated for this subspecies. The CNMI Government also classified this subspecies as threatened/endangered, and included it on the local CNMI list that was published in the Commonwealth Register in 1991.

The megapode populations currently persist on 13 of the islands in the archipelago, excluding Guam and Rota (Falanruw 1975, USFWS 1998). The recovery plan (USFWS 1998) states that there are approximately 1,440-1,975 megapodes in the Mariana Islands, about 97% of which reside on the islands north of Saipan. Based on the lack of optimal habitat for this species at Tinian Harbor, a “no effect” determination is anticipated.

## **ERPETOFAUNA**

### **Mariana Skink (*Emoia slevini*)**

The Mariana Skink (*Emoia slevini*), is the only lizard endemic to the Mariana Islands (Zug 2013). It has been recorded on Sarigan, Guguan, Alamagan, Pagan, and Asuncion (GDAWR 2006, Liske-Clark 2015).

The Mariana Skink was federally listed as endangered on 1 October 2015 (USFWS 2015). No critical habitat has been designated for this species. This species has not been recognized as threatened/endangered by the CNMI Government. Based on the lack of optimal habitat for this species at Tinian Harbor, a “no effect” determination is anticipated.

### **Micronesia Saw-tailed Gecko (*Perochirus ateles*)**

The Micronesia Saw-tailed Gecko (*Perochirus ateles*) is indigenous to the Mariana Islands. The Gecko is considered to be extirpated from Guam due to intense predation by the Brown Treesnake (Rodda and Fritts 1992). A *P. ateles* population persists on Cocos (Perry et al. 1998); however, abundance, habitat use, and status information are unknown.

The Micronesia Saw-tailed Gecko is listed as threatened/endangered by the CNMI Government. This species has not been recognized as threatened/endangered by the USFWS. Based on the lack of optimal habitat for this species at Tinian Harbor, a “no effect” determination is anticipated.

## **GASTROPODS**

### **Humped Tree Snail (*Partula gibba*)**

The Humped Tree Snail (*Partula gibba*) is the most widely distributed tree snail in the Mariana archipelago. Currently, the species is present on Guam, Rota, Saipan, Tinian, Sarigan, Alamagan, and Pagan (Hadfield 2010, DON 2014, USFWS 2015).

The Humped Tree Snail was federally listed as endangered on 1 October 2015 (USFWS 2015). No critical habitat has been designated for this species. This species has not been recognized as threatened/endangered by the CNMI Government. Based on the lack of optimal habitat for this species at Tinian Harbor, a “no effect” determination is anticipated.

## **PLANTS**

### **Ufa-halomtano (*Heritiera longipetiolata*)**

Ufa-halomtano (*Heritiera longipetiolata*) is a tree in the hibiscus family, and endemic to the Mariana Islands (Stone 1970, USFWS 2015). Ufa-halomtano presently persists in 10 occurrences comprising approximately 200 individuals on Guam, Rota, Tinian, and Saipan (Harrington et al. 2012, USFWS 2015).

*H. longipetiolata* was federally listed as endangered on 1 October 2015 (USFWS 2015). No critical habitat has been designated for this species. This species has not been recognized as threatened/endangered by the CNMI Government. Based on the lack of optimal habitat for this species at Tinian Harbor, a “no effect” determination is anticipated.

### ***Dendrobium guamense***

*Dendrobium guamense* is an epiphytic orchid historically known from Guam, Rota, Tinian, Saipan, and Agrihan (USFWS 2015). About 1,250 individuals occur among at least 21 known occurrences on Guam (four occurrences totaling less than 250 individuals), Rota (15 occurrences totaling more than 700 individuals), and Tinian (two occurrences with an unknown number of individuals (USFWS 2015). In addition, a single known Monkeypod Tree (*Samanea saman*) is currently host to *D. guamense* on Saipan (N. Johnson, pers. obs.).

*D. guamense* was federally listed as threatened on 1 October 2015 (USFWS 2015). No critical habitat has been designated for this species. This species has not been recognized as threatened/endangered by the CNMI Government. Based on the lack of optimal habitat for this species at Tinian Harbor, a “no effect” determination is anticipated.

### **Berenghenas Halomtano (*Solanum guamense*)**

Berenghenas Halomtano (*Solanum guamense*) is a small shrub in the nightshade family that is endemic to the Mariana Islands (Stone 1970). Historically present on Guam, Rota, Saipan, Tinian, Asuncion, Guguan, and Maug, *S. guamense* is currently known from a single individual on Guam (USFWS 2015).

*S. guamense* was federally listed as endangered on 1 October 2015 (USFWS 2015). No critical habitat has been designated for this species. This species has not been recognized as threatened/endangered by the CNMI Government. Based on the lack of optimal habitat for this species at Tinian Harbor, a “no effect” determination is anticipated.

### ***Tuberolabium guamense***

*Tuberolabium guamense* is an epiphytic orchid historically known from Guam, Rota, Tinian, and Aguiguan (USFWS 2015).

*Tuberolabium guamense* was federally listed as threatened on 1 October 2015 (USFWS 2015). No critical habitat has been designated for this species. This species has not been recognized as threatened/endorsed by the CNMI Government. Based on the lack of optimal habitat for this species at Tinian Harbor, a “no effect” determination is anticipated.

#### **7.1.1.2. Federal and CNMI Protected Marine Fauna and Flora**

The NOAA Pacific Islands Regional Office (Honolulu, HI) listed a total of 39 marine species (or Distinct Population Segments) in the Marianas archipelago; 28 marine mammals; 5 sea turtles, 3 fish and 3 corals<sup>21</sup>. There are no candidate species or other species proposed for listing. Most of the species listed are pelagic and found offshore and do not occur in the shallow nearshore waters of Tinian. The list of potentially affected species narrows even further when only the Tinian Harbor project site is considered. However, there are several species going through a status review for consideration for possible listing. It should be noted that all marine mammals are also protected under the Marine Mammal Protection Act.

Critical habitat has not been designated nor is currently being proposed in CNMI waters for any listed species under NMFS jurisdiction. However, identification of critical habitat in the Marianas for the listed coral species and the green sea turtle is currently under development. Critical Habitat for these species could be proposed as early as 2018.

The following species accounts are for those ESA and CNMI protected marine species that may occur in the Tinian Harbor area of Tinian. Based on the species’ life history and habitat requirements and the potential impacts proposed actions described in the Tinian Harbor Master Plan, a preliminary effects determination was made.

#### **Green Sea Turtle (*Chelonia mydas*)**

In response to a decline in population levels, the green turtle was listed as threatened under the Endangered Species Act, except for the Florida and Pacific coast of Mexico breeding populations, which are listed as endangered, on 28 July 1978 (43 FR 32800). Critical habitat was identified by the NMFS on 2 September 1998 (Volume 63, Number 170) as occurring in waters extending seaward 3 nm from the Mean High Water Line of Isla de Culebra (Culebra Island), Puerto Rico.

The first organized sea turtle research that focused on Tinian nesting females was conducted by the USFWS (1996; see also Pultz, et.al. 1999). An assessment of all beaches on Tinian found that they all were potential nesting sites, and that green turtle populations in the southern five islands of the CNMI, (Kolinski, et.al. 2004) found that Tinian contained the highest densities of sea turtles, followed by Saipan, Rota, Aguijan and Farallon de Medinilla. Interestingly, sea turtle densities were not found to be significantly correlated with island and reef perimeters. For example, Tinian has a 54.6-kilometer perimeter coastline and nearly twice the number of sea turtles when compared with the much longer 75.2-kilometer coastline of Saipan. The near shore sea turtle population around the southern CNMI islands was estimated between 1,000 and 2,000. Kolinski, et.al. (2004) also noted the predominance of juvenile sea turtles identified from the numerous surveys and suggested further

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<sup>21</sup> [http://www.fpir.noaa.gov/PRD/prd\\_marine\\_protected\\_species\\_of\\_mariana\\_islands\\_list.html](http://www.fpir.noaa.gov/PRD/prd_marine_protected_species_of_mariana_islands_list.html)

research in tagging and size differentiation be pursued. Based on local knowledge, green turtles are commonly observed in Tinian Harbor waters, therefore a “may affect” determination is anticipated.

#### **Hawksbill Sea Turtle (*Eretmochelys imbricata*)**

Population declines resulted in the hawksbill turtle being listed as endangered on 2 June 1970 (35 FR 8495). Critical habitat was identified by the NMFS on 2 September 1998 (Volume 63, Number 170) as occurring in waters extending seaward 3 nm from the Mean High Water Line of Isla de Mona (Mona Island), and Isla Monito (Monito Island), Puerto Rico. Foraging hawksbills are observed from virtually all the island groups in Oceania, from the Galapagos Islands in the eastern Pacific to the Republic of Palau in the Western Pacific. Hawksbills nest on the islands and mainland of Southeast Asia, from China and Japan, throughout the Philippines, Malaysia, and Indonesia, to Papua New Guinea, the Solomon Islands and Australia (USFWS 1998).

No hawksbill turtles were documented by Pultz, et.al. (1999), Kolinski, et.al. (2001), Kolinski, et.al. (2004) and Kolinski, et.al (2005). However, there is anecdotal and documented evidence of hawksbill sea turtles in the Northern Marianas. Although hawksbill turtles are much less abundant than the green turtle in the nearshore waters, a “may affect” determination would also likely be appropriate for the hawksbill turtle.

### **CORAL**

#### **Coral (*Acropora globiceps*)**

NOAA listed this coral species as threatened on 10 October 2014. Although presently under development, no critical habitat has been designated at this point in time.

Based on confirmed observations and strong predictions of occurrence in areas that have not yet been surveyed sufficiently, *Acropora globiceps* is likely distributed from the oceanic west Pacific to the central Pacific as far east as Pitcairn Islands. *Acropora globiceps* is considered to occur in Guam, CNMI, American Samoa, and the Pacific Remote Island Areas. *Acropora globiceps* is susceptible to the three major threats identified for corals including ocean warming, disease, and ocean acidification, as well as many of the other threats to corals. Due to the dearth of knowledge on the distribution of this coral species, surveys will have to be conducted prior to making an effect determination.

#### **Coral (*Seriatopora aculeata*)**

NOAA listed this coral species as threatened on 10 October 2014. Although presently under development, no critical habitat has been designated at this point in time.

Based on confirmed observations and strong predictions of occurrence in areas that have not yet been surveyed sufficiently, *Seriatopora aculeata* is likely distributed mostly within the Coral Triangle area (the Philippines to Timor Leste and east to the Solomon Islands), as well as adjacent areas in the western Pacific from the Mariana Islands down to New Caledonia. *Seriatopora aculeata* has not yet been reported from American Samoa and the Pacific Remote Island Areas (PRIA). *Seriatopora aculeata* is considered to occur in Guam and CNMI.

*Seriatopora aculeata* is susceptible to the three major threats identified for corals including ocean warming, disease, and ocean acidification, as well as many of the other threats to corals. Due to the dearth of knowledge on the distribution of this coral species, surveys will have to be conducted prior to making an effect determination.

## 7.2. Environmental Permitting Requirements

The following federal and CNMI permits, authorizations, or consultations will be required for implementing the Tinian Harbor Master Plan:

Before any permit applications can be submitted for agency review and action, the federal action agency (assuming the project will be federally funded) must comply with the National Environmental Policy Act (NEPA) policy guidelines developed for that agency.

### 7.2.1. Relevant Environmental Federal Permits, authorizations or consultations

- National Environmental Policy Act of 1969 (NEPA) (42 U.S. Code [USC] 4321 et seq.)
- Rivers and Harbors Act of 1899, Section 10 (33 U.S. Code 403)
- Federal Water Pollution Control Act as amended by the Clean Water Act of 1977, Sections 401, 402, and 404 (33 U.S. Code 1251 et seq.)
- Coastal Zone Management Act (CZMA) of 1972 (16 U.S. Code 145 et seq.)
- Endangered Species Act of 1973 (16 U.S. Code 1531 et seq.)
- Marine Mammal Protection Act (MMPA) (Title 17 Chapter 32)
- Fish and Wildlife Coordination Act (FWCA) (16 USCA §§ 661-668ee)
- Magnuson-Stevens Act; Section 305 Essential Fish Habitat review
- National Historic Preservation Act, Section 106 Review

Table 7-2: Overview of relevant Federal permits required for implementing the Tinian Harbor Master Plan

Federal Permits, Authorizations, and Consultations			
Permit or Authorization	Lead Agency	Consulting Agency	Comments
National Environmental Policy Act EA or EIS	Federal Action Agency <i>Unknown at this time</i>	Various	NEPA does not allow piece-mealing of federal actions, therefore the effects analysis must be conducted on the overall project through all Phases. The minimal level of NEPA documentation will be an Environmental Assessment, the highest would be an Environmental Impact Statement. It is premature at this time to determine what level of NEPA documentation will be required to meet the obligations of the yet to be determined federal action agency.
Clean Water Act; Section 402 NPDES NOI	U.S. Environmental Protection Agency	Division of Environmental Quality (BECQ)	A General Construction NOI will be required.

Federal Permits, Authorizations, and Consultations				
Permit or Authorization	Lead Agency	Consulting Agency	Comments	
Clean Water Act; Section 404  Rivers and Harbors Act of 1899; Section 10	U.S. Army Corps of Engineers	NOAA Fisheries U.S. Fish and Wildlife Service CNMI Department of Lands and Natural Resources CNMI Division of Environmental Quality (BECQ) CNMI Division of Coastal Resources Management (BECQ).	The Corps would issue one permit that encompasses both of these authorities; not two separate permits. Issuance of the permit comes with full NEPA review in accordance with Corps guidelines.	
		<b>Additional Consultations by Corps</b>		
		<b>Law or Issue</b>	<b>Consulting Agency</b>	<b>Comments</b>
		Magnuson-Stevens Act; Section 305 Essential Fish Habitat review	NOAA Fisheries	EFH guidelines are currently being revised.
		Endangered Species Act; Section 7 Consultation	NOAA Fisheries U.S. Fish and Wildlife Service	The Green Sea Turtle ( <i>Chelonia mydas</i> ) is commonly observed in Tinian Harbor waters and is listed as a threatened species under the ESA. There is a chance that the Section 7 consultation may go formal. Surveys for other ESA listed species (e.g., corals) will need to be conducted.
		Fish and Wildlife Coordination Act	U.S. Fish and Wildlife Service	
		Use dredge material for fill material	U.S. Army Corps of Engineers CNMI Division of Environmental Quality	There is a high likelihood that the agencies will require testing for specific contaminants of bottom sediment prior to using it as fill material.
Presence/absence of UXO in Tinian Harbor	U.S. Army Corps of Engineers CNMI Division of Environmental Quality CNMI Department of Public Services	This will likely require a joint agency team to develop guidance on survey methodology and ultimate removal and disposal.		



### 7.2.2. Relevant Environmental CNMI Government Permits

The two local CNMI environmental permitting agencies are under the Bureau of Environmental and Coastal Quality (BECQ); the Division of Coastal Resources Management Office (DCRM) and Division of Environmental Quality (DEQ). The following permits will be required:

- Division of Environmental Quality Section (DEQ) 401 Water Quality Certification
- Division of Environmental Quality Earthmoving and Erosion Control Permit
- Division of Coastal Resources Management (CRM), Federal Consistency Determination

Table 7-3: Overview of relevant CNMI environmental permits required for implementing the Tinian Harbor Master Plan.

CNMI Permits and Authorizations			
Permit	Lead Agency	Consulting Agency	Comments
<b>Coastal Resources Permit</b>  <i>Major Siting or Federal Consistency</i>	Division of Coastal Resources Management (BECQ)	CRM Board Members: <ul style="list-style-type: none"> <li>• Department of Commerce</li> <li>• Commonwealth Utilities Corporation</li> <li>• Department of Lands and Natural Resources</li> <li>• Department of Public Works</li> <li>• Historic Preservation Office</li> <li>• Division of Environmental Quality</li> </ul>	There may be two options for having the proposed action approved by the DCRM. Either the DCRM will require a separate Major Siting permit or the action will be reviewed and addressed through the Federal Consistency program.
<b>Earthmoving and Erosion Control Permit</b>	Division of Environmental Quality (BECQ)	Division of Fish and Wildlife Historic Preservation Office	
<b>Clean Water Act; Section 401 WQC</b>	Division of Environmental Quality (BECQ)	none	The DEQ will require daily monitoring of water quality (e.g. turbidity) over the dredging period.
<b>CNMI Submerged Lands Act</b>	Department of Lands and Natural Resources	CNMI Legislature	The proposed action is not specifically addressed in the Submerged Land Act. Further investigation will be required to ensure the proposed action is exempted from this law.

### 7.3. Potential Impacts to Important Natural Resources

Six special aquatic sites are identified in the CWA section 404(b)(1) Guidelines that require special consideration and mitigation prior to being impacted by dredge and fill activities: sanctuaries and refuges, wetlands, mud flats, vegetated shallows, coral reefs, and riffle and pool complexes.

Unavoidable project-related impacts to these habitats will need to address the requirements outlined in the 2008 Federal Compensatory Mitigation for Losses of Aquatic Resources regulations as jointly promulgated by the USEPA and USACE. Sanctuaries/refuges, seagrasses, and coral reefs occur in the vicinity of the Tinian Harbor. Further surveys will have to be conducted to determine the magnitude of impact to these resources.

### 7.3.1. Sanctuaries and Refuges

The Tinian Marine Reserve was established by Public Laws 15-90 and 17-14 and lies between Tinian Harbor and South Carolinas Point, extending seaward 0.5 miles.

### 7.3.2. Vegetated Shallows

Tsuda, et.al. (1977) listed three species of seagrasses that are known from the CNMI; *Enhalus acoroides*, *Halophila minor*, and *Halodule uninervis*. A fourth species of sea grass, *Halophila ovalis*, was recently discovered during a sea turtle assessment study on Saipan (Kolinski, et.al., 2001). Only three islands in the CNMI are known to have seagrasses; Saipan, Tinian and Rota.

### 7.3.3. Coral Reefs

Coral colony growth occurs on harbor bulkheads and other manmade substrates, as well as in scattered patches within the harbor proper that includes the areas proposed for dredging. It is not anticipated that coral reefs will occur in the commercial harbor, however, further surveys will have to be conducted to make this determination.

Dredging activities may require the development of a compensatory mitigation plan to address the unavoidable impacts to the seagrasses, and coral growth. Mitigation could include on-site in-kind coral transplantation that may include monitoring and the meeting of performance standards.

Table 7-4 provides an overview of impacts to marine resources by project component.

Table 7-4: Potential project related impacts to natural resources

Proposed Action	Anticipated Magnitude of Impact to Natural Resources
Installation of new bollards and berthing fenders along North Quay dock face. Supply new cargo hose to extend tanker berth range.	<p><b>Minor</b></p> <ul style="list-style-type: none"> <li>No significant impacts expected to marine environment.</li> <li>Likely insignificant modifications to Tinian Harbor which is eligible as a historic district under criteria A and C.</li> </ul>
Repair wharf cap and bull rail at berth 1 and 3.	<p><b>Minor</b></p> <ul style="list-style-type: none"> <li>No significant impacts expected to marine environments.</li> <li>Likely insignificant modifications to Tinian Harbor which is eligible as a historic district under criteria A and C.</li> </ul>
Demolish and dredge Finger Piers A and B and construction of revetted slope structure (e.g., fill).	<p><b>Major</b></p> <ul style="list-style-type: none"> <li>Significant modification to Tinian Harbor which is eligible as a historic district under criteria A and C.</li> <li>Significant adverse impact to non-motile and slow moving benthic resources living in immediate vicinity of Finger Piers A.</li> <li>Generation of turbidity plumes during dredge and fill activities.</li> <li>Potential “may effect” to listed federal T&amp;E species.</li> </ul>
Dredging of Tinian Harbor	<p><b>Major</b></p> <ul style="list-style-type: none"> <li>Proposed 250,00 cy for maintenance dredging and 50,000 cy for new dredging</li> <li>Generation of sediment plumes during dredging activities.</li> <li>Significant adverse impact to non-motile and slow moving benthic resources within the dredge footprint.</li> <li>Potential “may effect” to listed federal T&amp;E species.</li> </ul>
Fill to create additional dock area	<p><b>Major</b></p> <ul style="list-style-type: none"> <li>Significant modification to Tinian Harbor structures that are eligible as a historic district under criteria A and C.</li> <li>Generation of turbidity plumes during fill activities.</li> </ul>

- Significant adverse impact to non-motile and slow moving benthic resources within the footprint of the fill material.
- Potential “*may effect*” to listed federal T&E species.

## 7.4. Environmental Mitigation

The generally accepted approach in applying mitigation for actions in aquatic environments follows the policy developed by the USACE and the USEPA (see 1990 Memorandum of Agreement). The three types of mitigation shown below are typically followed in the order presented:

- (1) *Avoidance* means mitigating an aquatic resource impact by selecting the least-damaging project type, spatial location and extent compatible with achieving the purpose of the project. Avoidance is achieved through an analysis of appropriate and practicable alternatives and a consideration of impact footprint.
- (2) *Minimization* means mitigating an aquatic resource impact by managing the severity of a project's impact on resources at the selected site. Minimization is achieved through the incorporation of appropriate and practicable design and risk avoidance measures.
- (3) *Compensatory Mitigation* means mitigating an aquatic resource impact by replacing or providing substitute aquatic resources for impacts that remain after avoidance and minimization measures have been applied, and is achieved through appropriate and practicable restoration, establishment, enhancement, and/or preservation of aquatic resource functions and services.

As the Master Plan goes through the NEPA review process, avoidance and minimization measures will be identified based on the type and magnitude of impacts to aquatic resources. This process will also explore several alternatives of meeting the same objectives, through slightly different approaches and each alternative will be analyzed against the other. The preferred alternative is typically selected when mitigation measures are able to minimize the sum total of impacts to the marine resources. Unavoidable impacts to marine resources will require development of a compensatory mitigation plan that would follow the 2008 Federal Compensatory Mitigation for Losses of Aquatic Resources regulations.

Development of mitigation measures prior to a NEPA analysis is preliminary, however, there are several agencies that have previously developed mitigation measures that can be applied to all issued permits. The most extensive list of mitigation measures was developed by the USACE and will be used as a planning guide for purposes of this Master Plan.

The following best management practices, or BMPs, and general conditions measures are typically included on USACE permits issued in the Western Pacific under the Western Pacific Standard Local Operating Procedures for Endangered Species (Pac-SLOPES). Although presented in no particular order, similar measures are grouped together. Not all BMPs or mitigation measures may be applicable to the in-water activities being proposed by the Tinian Harbor Master Plan.

Typical mitigation measures that are expected to be included on any USACE permit:

- Each permit will contain the requirement that the permittee document and report to the Corps and NMFS, all interactions with listed species, including the disposition of any listed species that are injured or killed. Should an ESA-listed species be adversely affected, all work must stop pending re-initiation and completion of consultation between the Corps and NMFS Protected Resources Division for that action.

- Projects that would affect structures or substrate with ESA-listed corals attached are excluded from coverage under Pac-SLOPES.
  - For in-water work where ESA corals may occur, structures and substrate that could be affected by the proposed activity must be surveyed by personnel qualified to identify ESA-listed corals.
  - Should ESA-listed corals be present in the project area, but not on the structures or substrate that would be directly impacted by the activity, that activity may be covered under Pac-SLOPES if the activity complies with the conditions and best management practices.
  - To minimize impacts to coral larvae, notably the listed species covered in this programmatic consultation, the permittee shall avoid in-water work during mass-coral spawning times or peak coral spawning seasons. Permittees must consult with local biologists (either NMFS Habitat Conservation Division representatives in their respective locations, or the appropriate local government agencies) to determine the exact period and dates when coral spawning would occur for the given year.
- Constant vigilance shall be kept for the presence of non-coral ESA-listed marine species (sea turtles, marine mammals, sharks) during all aspects of the permitted action.
  - A responsible party, i.e., permittee/site manager/project supervisor, shall designate a competent observer to search/monitor work sites and the areas adjacent to the authorized work area for ESA-listed marine species;
  - Searches and monitoring shall be made prior to the start of work each day, including prior to resumption of work following any break of more than one-half hour. Additional periodic searches and monitoring throughout the work day are strongly recommended;
  - All in-water work will be postponed or halted when ESA-listed marine species are within 50 yards of the proposed work, and will only begin/resume after the animals have voluntarily departed the area, with the following exception: if ESA-listed marine species are noticed within 50 yards after work has already begun, that work may continue only if, in the best judgment of a biologist, the activity is unlikely to disturb or harm the animal(s), for example, divers performing surveys or underwater work (excluding the use of toxic chemicals) is likely safe, the use of heavy machinery is not; and
  - Project-related personnel shall NOT attempt to disturb, touch, ride, feed, or otherwise intentionally interact with any protected species.
- Project footprints must be limited to the minimum area necessary to complete the project.
- The project area must be flagged to identify and avoid impacts to sensitive resource areas, such as corals, seagrass beds, listed terrestrial plants, and sea turtle nests.
- Work located channel ward of the Mean Higher High Tide Line of navigable water or channel ward of the upward limits of adjacent wetlands must be timed to minimize effects on ESA-listed species and their habitats.
- Project operations must cease under unusual conditions, such as large tidal events and high surf conditions, except for efforts to avoid or minimize resource damage.
- A storm water management plan, commensurate to the size of the project, must be prepared and carried out for any project that will produce any new impervious surface or a land cover conversion that will slow the entry of water into the soil to ensure that effects to water quality and hydrology are minimized.
- A pollution and erosion control plan for the project site and adjacent areas must be prepared and carried out. As a minimum, this plan shall include:
  - Proper installation and maintenance of silt fences/curtains, saudades, equipment diapers, or drip pans.
  - A contingency plan to control and clean spilled petroleum products and other toxic materials.

- Appropriate materials to contain and clean potential spills will be stored at the work site, and be readily available.
- All project-related materials and equipment placed in the water will be free of pollutants.
- Daily pre-work inspections of heavy equipment for cleanliness and leaks, with all heavy equipment operations postponed or halted until leaks are repaired and equipment is cleaned.
- Fueling of project-related vehicles and equipment will take place at least 50 feet away from the water and within a containment area, preferably over an impervious surface;
- A plan will be developed to prevent trash and debris from entering the marine environment during the project.
- All construction discharge water (e.g., concrete washout, pumping for work area isolation, vehicle wash water, drilling fluids) must be treated before discharge.
- Erosion controls must be properly installed before any alteration of the project area may take place.
- Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.
- Native species suitable for the impacted habitat must be considered for re-vegetation for the purposes of restoring areas temporarily disturbed by the authorized work to their pre-disturbance condition.
- All disturbed areas must be immediately stabilized following cessation of activities for any break in work longer than 4 days.
- Drilling and dredging are restricted to uncontaminated areas, and any associated waste or spoils must be completely isolated and disposed of in an approved upland disposal location.
- You must remain vigilant for the presence of non-coral ESA-listed marine species (sea turtles, marine mammals, sharks) during all aspects of the permitted action.
- A responsible party, i.e., permittee/site manager/project supervisor, shall designate a competent observer to search/monitor work sites and the areas adjacent to the authorized work area for ESA-listed marine species;
- Searches and monitoring shall be made prior to the start of work each day, including prior to resumption of work following any break of more than one-half hour. Additional periodic searches and monitoring throughout the work day are strongly recommended;
- Equipment operators shall employ “soft starts” when initiating work each day and after each break of 30 minutes or more that directly impacts the bottom. Buckets and other equipment shall be sent to the bottom in a slow and controlled manner for the first several cycles before achieving full operational impact strength or tempo;
- Project-related personnel shall NOT attempt to disturb, touch, ride, feed, or otherwise intentionally interact with any protected species.
- Project footprints must be limited to the minimum area necessary to complete the project.
- A plan will be developed to prevent trash and debris from entering the marine environment during the project.
- Mooring systems shall employ the minimum line length necessary to account for expected fluctuations in water depth due to tides and waves.
- Mooring systems shall be designed to keep the line as tight as possible, with the intent to eliminate the potential for loops to form.
- Mooring lines shall consist of a single line. No additional lines or material capable of entangling marine life may be attached to the mooring line or to any other part of the deployed system.
- Mooring systems shall be designed to keep the gear off the bottom, by use of a mid-line float when appropriate, with the intent to eliminate scouring of corals or entanglement of the line on the substrate.

Best Management Practices as required by the Western Pacific Standard Local Operating Procedures for Endangered Species:

BMPs required for activity types that may result in collision with vessels:

- Vessel operators shall alter course to remain at least 100 yards from whales, and at least 50 yards from other marine mammals and sea turtles.
- Vessel operators shall reduce vessel speed to 10 knots or less when piloting vessels in the proximity of marine mammals, and to 5 knots or less when piloting vessels in areas of known or suspected turtle activity.
- If approached by a marine mammal or turtle, the vessel operator shall put the engine in neutral and allow the animal to pass.
- Vessel operators shall not encircle or trap marine mammals or sea turtles between multiple vessels or between vessels and the shore.

BMPs required for activity types that may result in direct physical impact:

- Before any equipment, anchor(s), or material enters the water, a responsible party, i.e., permittee/site manager/project supervisor, shall verify that no ESA-listed species are in the area where the equipment, anchor(s), or materials are expected to contact the substrate. If practicable, the use of divers to visually confirm that the area is clear is preferred.
- Equipment operators shall employ “soft starts” when initiating work each day and after each break of 30 minutes or more that directly impacts the bottom. Buckets and other equipment shall be sent to the bottom in a slow and controlled manner for the first several cycles before achieving full operational impact strength or tempo.
- All objects lowered to the bottom shall be lowered in a controlled manner. This can be achieved by the use of buoyancy controls such as lift bags, or the use of cranes, winches, or other equipment that affect positive control over the rate of descent.
- Equipment, anchor(s), or materials shall not be deployed in areas containing live corals, sea grass beds, or other significant resources.

BMPs required for activity types that may result in entanglement:

- Mooring systems shall employ the minimum line length necessary to account for expected fluctuations in water depth due to tides and waves.
- Mooring systems shall be designed to keep the line as tight as possible, with the intent to eliminate the potential for loops to form.
- Mooring lines shall consist of a single line. No additional lines or material capable of entangling marine life may be attached to the mooring line or to any other part of the deployed system.
- Mooring systems shall be designed to keep the gear off the bottom, by use of a mid-line float when appropriate, with the intent to eliminate scouring of corals or entanglement of the line on the substrate.
- Any permanent or long-term deployments shall include an inspection and maintenance program to reduce the likelihood of failures that may result in loose mooring lines lying on the substrate or hanging below a drifting buoy.
- Mooring systems, including those used for temporary markers, scientific sensor buoys, or vessel moorings, shall be completely removed from the marine environment immediately at the completion of the authorized work or the end of the mooring’s service life. The only exceptions to this rule shall be mooring anchors such as eyebolts that are epoxied into the substrate and which pose little or no risk to marine life.

BMPs required for activities that may result in exposure to elevated noise levels:

- For any equipment used in undertaking the authorized work (i.e. dredging, minor excavation) a mandatory shut-down range of 50 m will ensure that no ESA-listed marine animals are exposed to sound levels anywhere near the TTS threshold isopleths.
- Maintenance dredging, in-water excavation, movement of large armor stones, and benthic core sampling shall not be undertaken if any ESA-listed species is within 50 yards of the authorized work, and those operations shall immediately shut-down if an ESA-listed species enters within 50 yards of the authorized work.

Marina or Harbor Repair and Improvement Activities:

- Replacement decking should be designed to reduce in-water shading to the greatest extent practicable.
- Repair and removal work will be accomplished in a manner that minimizes the potential spread of invasive species that may reside on the pilings such as immediate removal from the water upon extraction or other appropriate approved containment methods.
- Removed materials must be disposed of at an approved upland disposal site.

Piling Installation, Repair, Replacement and/or Removal:

- Repair and removal work will be accomplished in a manner that minimizes the potential spread of invasive species that may reside on the pilings such as immediate removal from the water upon extraction or other appropriate approved containment methods.
- Removed pilings must be disposed of at an approved upland disposal site.

Maintenance Dredging:

- With the exception of the actual dredging apparatus (e.g. clamshell buckets, or the scoop and articulated arm of a backhoe, hydraulic head, etc.), heavy equipment will be operated from above and out of the water.
- Use of hydraulic dredging must include the installation of excluder devices adequate to prevent the entrainment or impingement of protected marine species such as sea turtles and juvenile scalloped hammerhead sharks.
- The applicant will not use a Trailing Suction Hopper Dredge (or hopper dredge) to conduct dredges. There have been numerous observed mortalities of sea turtles and sharks associated with these vessels.
- The applicant will not use Dustpan dredges, which use high velocity water jets to loosen material before sucking it into their apparatus. This technique causes high turbidity and the effects of water velocities from water jets to listed species have not been evaluated.
- The applicant may use cutter head dredges that are equipped with suction heads of 36 inches diameter or less, and a maximum intake velocity of 4.6 meters per second (15 feet per second), and an intake velocity of 95 cm per second (3.1 feet per second) at 1 meter away from the suction head.
- The applicant may use pipeline dredges with openings no larger than 36 inches diameter, and intake velocities of 4.6 meters at the source and 95 cm per second at 1 meter. To avoid lethal entrainment or dismemberment of sea turtles, hammerhead sharks, or marine mammals, suction head openings larger than 12 inches must be either screened with 2-inch mesh or less, operated or monitored by a diver, or behind a barrier (e.g., coffer dams or silt curtains).
- To minimize exposure to listed animals in the water column, the applicant will avoid moving the suction head through the water column while the pump is turned on. The applicant will turn on suction only when the suction heads are at the bottom and in contact with the sediment, and turn it off before lifting the suction head up to the surface.
- In known scalloped hammerhead shark nursery areas, the applicant will conduct all suction dredging behind barriers (e.g., coffer dams or silt curtains), or with a diver operating or monitoring the suction head and screening.
- The portions of the equipment that enter the water will be clean and free of pollutants;

- Appropriate silt containment devices must be used and properly installed to avoid degradation of adjacent coral reefs, and aquatic vegetation.
- Dredged material must be deposited at upland sites, or at EPA designated ocean disposal sites provided sediment standards are met.

Other Minor Discharges and Dredging/Excavations:

- The site of excavation or discharge will contain no known forage or resting habitat for ESA-listed marine species.

The Section 401 Water Quality Certification (401 WQC) is the CNMI permit that is required to validate Rivers & Harbors Act Section 10 or Clean Water Act Section 404 permits. As appropriately named, the Section 401 WQC focuses on ensuring in-water construction activities do not violate established CNMI water quality standards. An approved Environmental Protection Plan is required for the issuance of a Section 401 WQC that includes a water quality monitoring plan that monitors turbidity levels outside of an approved mixing zone established by the DEQ. The actual monitoring plan is developed in concert with DEQ staff and based on the proposed work and physical environment where the work would occur. Mitigation measures associated with this permit are typically tailored to the in-water work being proposed.

## **7.5. Environmental Entitlement and Permitting, Cost Estimates, and Schedule**

Table 7-5 provides an overview of the required permits, anticipated level of difficulty, and estimated costs. This does not include costs for the NEPA analyses and assumes that the Master Plan will be implemented at one time. If the entire Master Plan goes through the NEPA process at one time, it is estimated that environmental entitlement, permitting consultation, survey, testing, and laboratory costs could range from \$500K to \$700K.

Table 7-6 shows the estimated timeline for permitting efforts for the Tinian Harbor Master, including NEPA. It is assumed that design plans are at a minimum 75% complete and ready for initial agency review at start of month one. The time includes data collection, agency coordination, public hearings, and finalization of permit or document.

Compliance with NEPA was not included in the itemized costs analysis, as it is dependent upon several variables that strongly influence costs: whether the Master Plan will be implemented by phase, if an EA or EIS would be pursued, and the NEPA requirements of the Federal action agency. Consultation services related to the preparation of a NEPA EA/EIS alone could cost between \$400K to \$600K.



Table 7-5: Relevant Federal and local environmental permits

Permit or Authorization	Level of Investigations	Anticipated Level of Difficulty	Estimated Permitting/Survey Costs
<b>Federal Permits</b>			
USEPA CWA Section 402 NPDES Construction General Permit NOI	NOI	Low	\$20K
USACE Section 10/404 Consultation/Department of the Army permit	Biological Assessment that would address ESA and EFH issues <i>Formal Section 7 and Section 305 consultation</i>	High	\$200K
	Archeological Report for NHPA Section 106 review	Medium	\$40K
	Testing of dredge material for contaminants that would be used for fill material <i>Assuming contaminants are found in harbor sediments</i>	Medium	\$200K
	Survey for Unexploded ordinance <i>Assuming Unexploded ordinance is found</i>	High	\$100K
	<b>CNMI Permits</b>		
DCRM Coastal Resources Management	Major Siting Permit	High	\$85K
	Federal Consistency	Low	\$15K
DEQ Earthmoving & Erosion Control Permit	Individual permit	Medium	\$20K
DEQ Clean Water Act; Section 401 Water Quality Certification	Individual authorization	Medium	\$20K

Table 7-6: Estimated timeline for permitting efforts

Permit or Authorization		Time in Months																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
NEPA	EA Option	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█									
	EIS Option	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█		
USACE Section 10/404 Permit	Biological Assessment & ESA section 7 consultation		█	█	█	█	█	█	█	█	█	█	█												
	Archeological Report and NHPA section 106 review		█	█	█	█	█	█																	
	MSA Essential Fish Habitat review			█	█	█	█	█																	
	Fish and Wildlife Coordination Act review			█	█	█	█																		
	Testing of harbor sediments for contaminants			█	█	█	█	█	█	█															
	UXO Survey																								
USEPA Section 402 NPDES NOI									█	█															
DCRM	Major Siting Permit Option		█	█	█	█	█	█	█																
	Federal Consistency Option													█	█							█	█		
DEQ EM&EC Permit								█	█	█	█														
DEQ CWA Section 401 WQC											█	█	█												

## 8.0 Economic Overview

### 8.1 Introduction

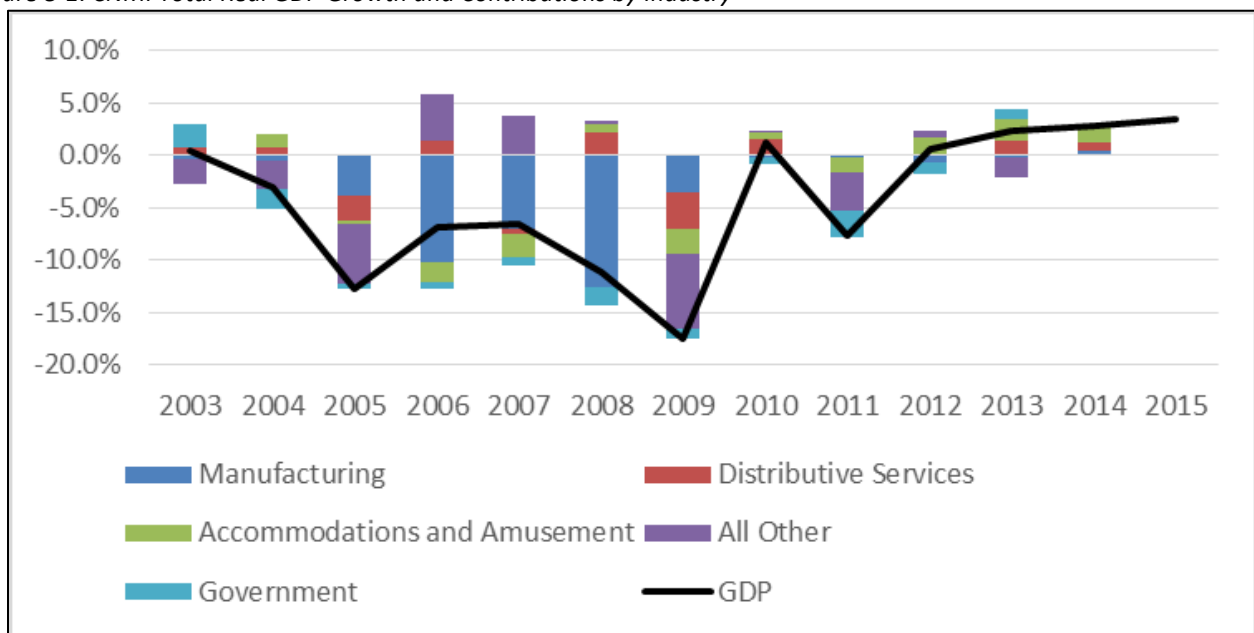
Chapters 8 and 9 of this Master Plan document are focused on the economic overview of the CNMI as a whole, and the financial performance of the CPA (seaport and airport operations combined) respectively. The reason for examining the performance of the CNMI and CPA (as opposed to just Tinian and the seaport operations) is that many of the factors that ultimately influence the demand for maritime port infrastructure on Tinian, and the ability to fund it, is contingent on the performance of Saipan. This is because so much of the CNMI's economic activity is currently concentrated in Saipan and thus trade demand, vessel routing/deployment preferences, and CPA revenue generation is closely associated with the performance of the island.

The projections presented in this analysis, therefore, are first developed for the CNMI and then allocated to Tinian. The CNMI real gross domestic product (GDP) declined in the years following the loss of the local garment manufacturing business, as illustrated in Figure 8-1. This industry had employed Chinese contract labor, and been a major driver of population growth and exports in CNMI until a combination of labor lawsuits and regulatory changes resulted in a seven-year decline in factory operations. The last garment factory using Chinese labor closed in 2009 at the nadir of the Global Financial crisis.

The permanent resident population of the islands fell over the same ten-year time period, roughly 1999 to 2009. However, since economic recovery began, population growth has resumed, approaching 2% per annum. The 2010 census estimated island population at: Saipan approximately 50,000 residents; Tinian approximately 3,500; and Rota approximately 3,300.

More recently, economic growth has been led by private investment in the accommodation and amusement sector (hotels, casinos and tourism). This sector in particular will be a key determinant of economic and trade performance in the foreseeable future.

Figure 8-1: CNMI Total Real GDP Growth and Contributions by Industry



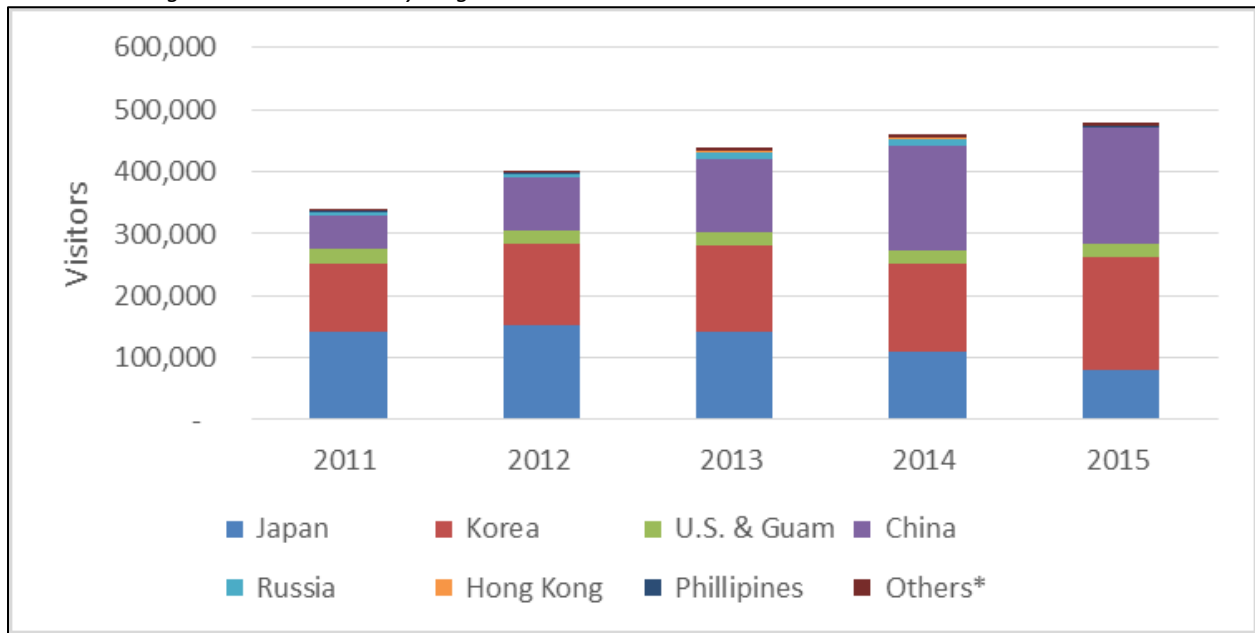
Source: Bureau of Economic Analysis

Total visitors to the CNMI totaled over 500,000 in 2016 with tourists outnumbering the local population by a factor of 10. Therefore, the volatility in passenger and freight movements (in aggregate) to/from the islands will continue to mirror movements in the total number of visitors. Continued investment in fixed infrastructure (roads, hotels and casinos, and commercial-industrial sites) will support demand for construction related material imports, which will fluctuate with the number and scale of such projects. Demand for other consumer related products including foods and beverages, clothing, and electronics will also vary relative to the level of tourists entering CNMI.

## 8.2. Passenger and Freight Review

Total visitors, as measured by visitor arrivals to CNMI have been increasing at an average rate of 8.8% annually since 2011, as presented in Figure 8-2. This robust growth has been driven by Chinese tourists (186,509 in 2015) which have displaced the Japanese (80,832) and Koreans (182,622) on a percentage basis as the dominant source-origins. Other fast growing markets have been the Southeast Asian nations, including the Philippines albeit at a much lower level. Visitor levels from Guam tend to be steady at roughly 20,000 per annum, probably tied to local family relationships as opposed to international tourism.

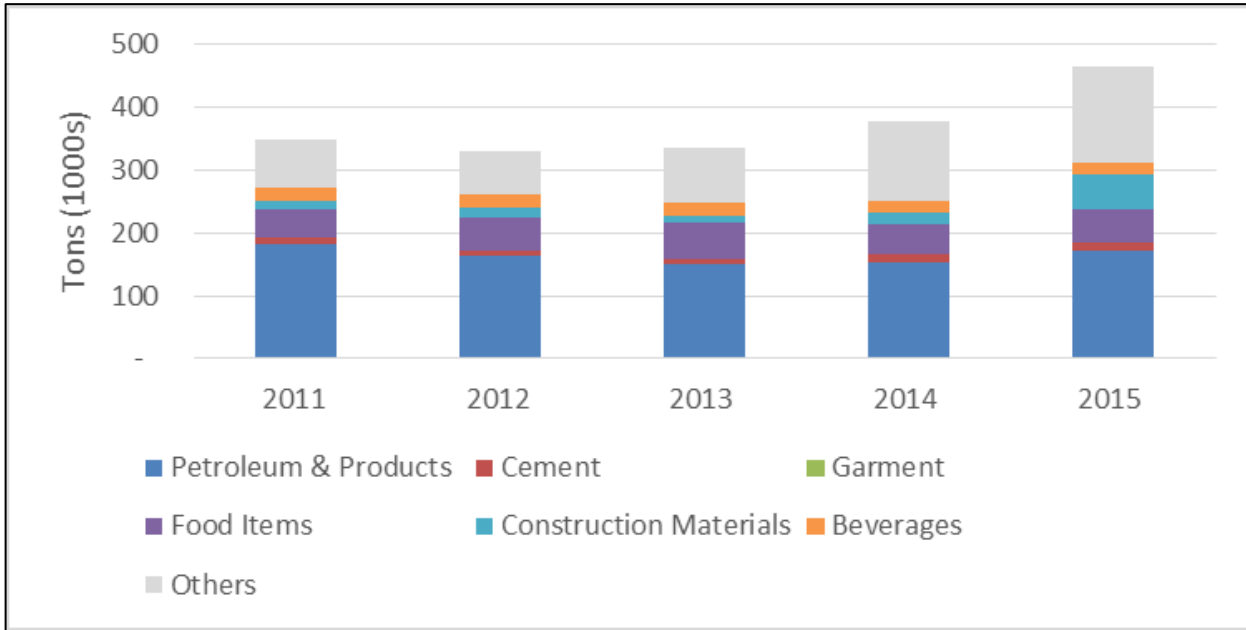
Figure 8-2: Passenger Arrivals to CNMI by Origin



Source: CNMI

The increase in visitors has helped support overall growth in demand of imported commodities (Figure 8-3). The largest volume in terms of tonnage is petroleum products that support a number of energy-related needs including electricity generation, and fuel for autos, airplanes and vessels. However, the strongest growth in recent years has come from construction related materials, including raw cement, which underscores the impact this sector has had on the overall economy of CNMI.

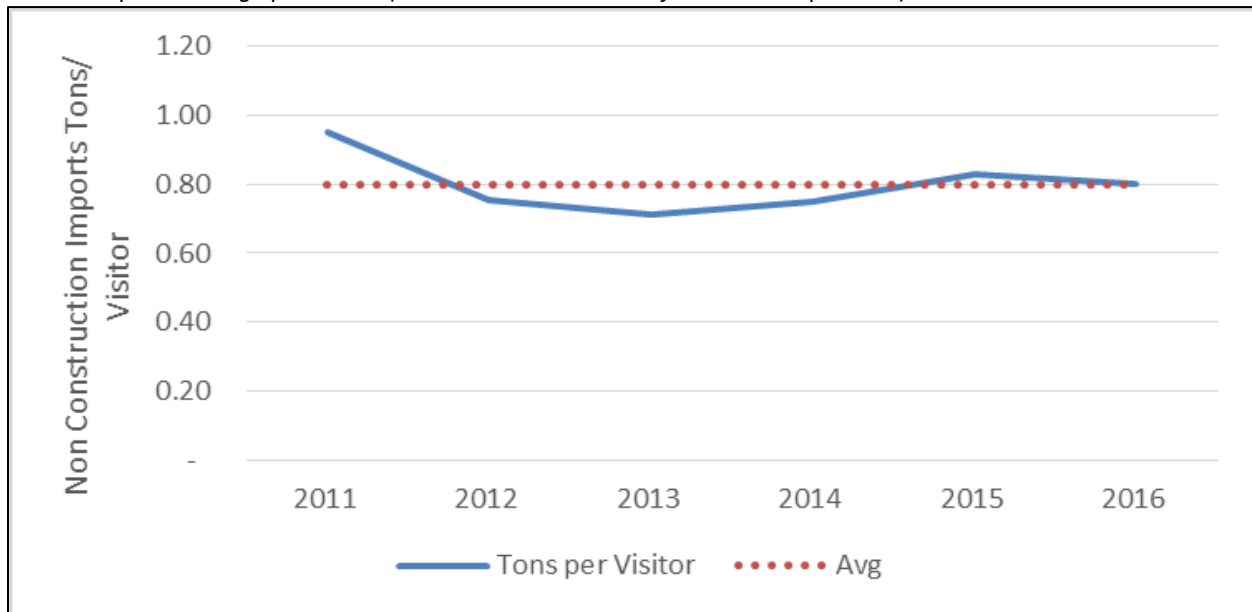
Figure 8-3: Imported Freight Volumes



Source: CPA

On visitor per-capita basis, import tonnage of non-construction materials has historically ranged from 0.9 to 0.7 tons per person, as illustrated in Figure 8-4. The average over the past five years has been 0.8 tons per capita. Embedded in this per-capita measure is the demand generated by the local population. It reflects total demand for energy products, food, beverages, vehicles and other goods that have not been classified as “Construction” by the CNMI. This measure is used as an input into the cargo projections developed for the CNMI and Tinian, presented in Section 8.3 of this report.

Figure 8-4: Import Tonnage per Visitor (Which includes Demand from Local Population)

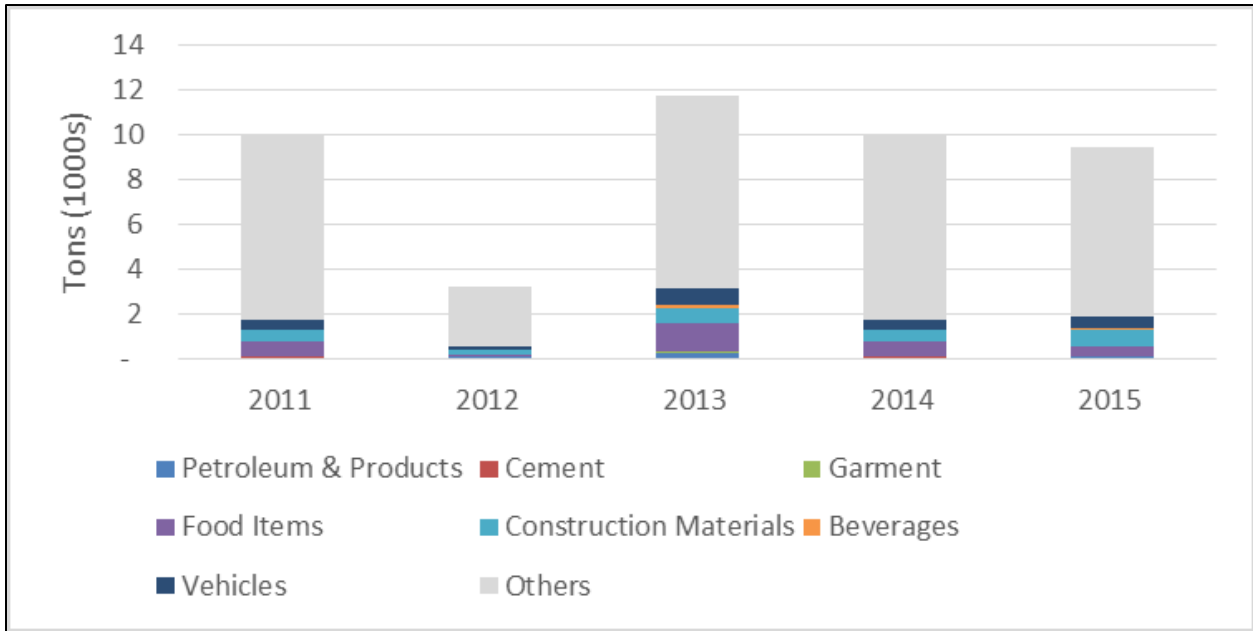


Source: CPA, M&N

The export volumes shown in Figure 8-5 are marginal by comparison with imports. Of the identifiable products, the largest weights include food products, construction materials and beverages. The majority (80%) of the

export tonnage is identified as “other” which is presumably waste paper/packaging that is returned in empty containers.

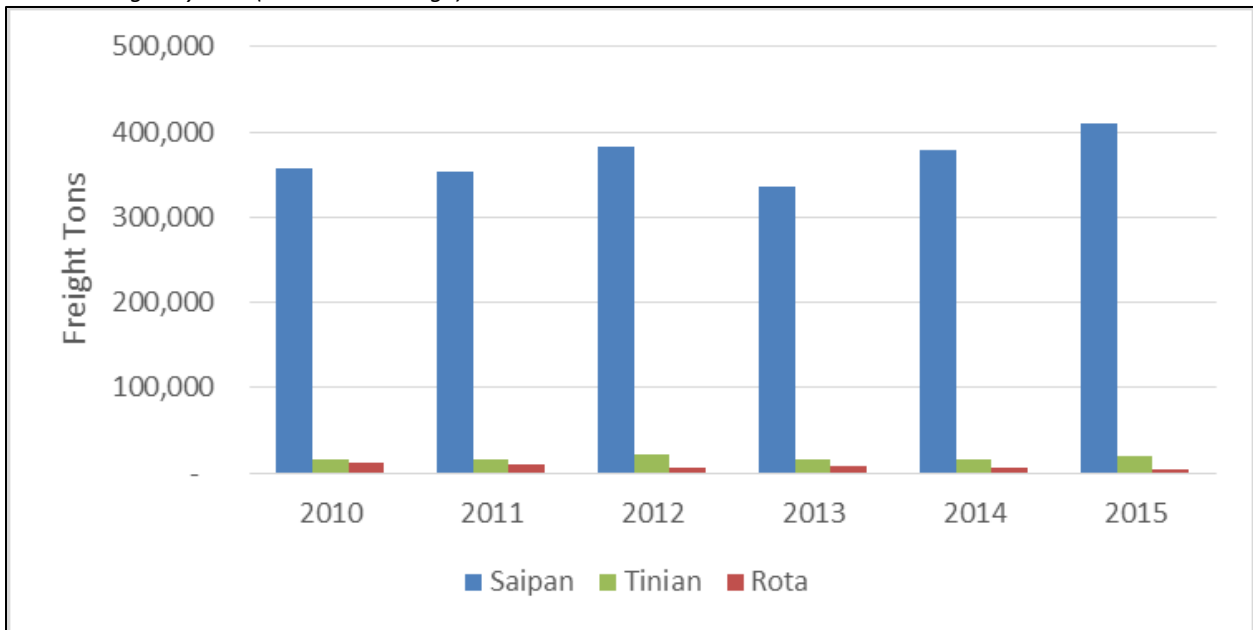
Figure 8-5: Export Freight



Source: CPA

Of the three commercial ports in CNMI, Saipan is undoubtedly the largest (Figure 8-6), being the population and economic center of the Commonwealth. The Port of Saipan serves as the transshipment hub for much of the cargo destined to and from Tinian and Rota. Saipan is estimated to have handled approximately 28,000 TEU in 2016, with approximately half as empty exports (historically, the empty incidence [share of empty containers] of export containers has averaged 85%).

Figure 8-6: Freight by Port (Revenue Tonnage)



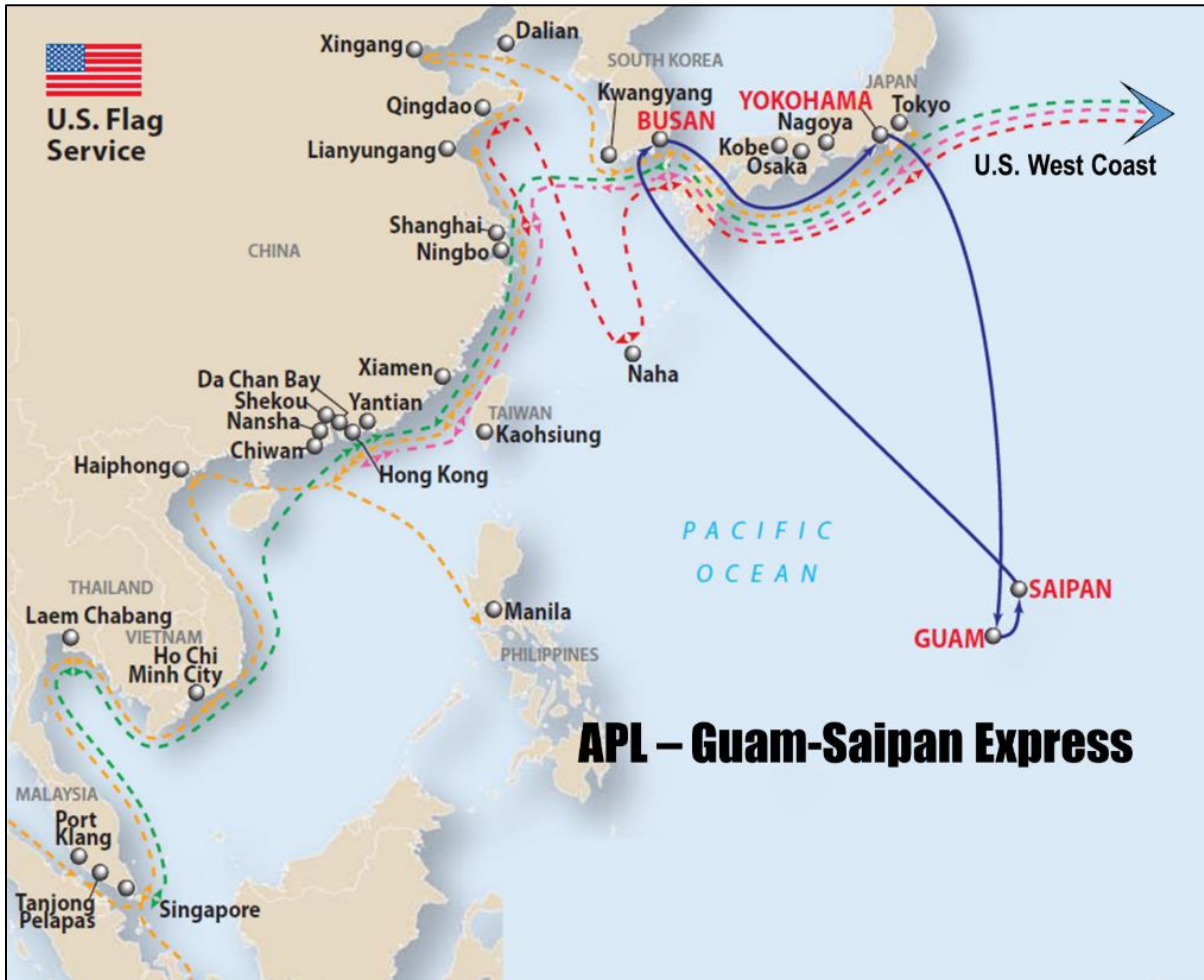
Source: CPA

Saipan is currently served by three, regular scheduled container services. These include:

- APL GSX Service – Two vessels 1,100 and 1,600 TEU capacity
- MELL – MXS Service: Four vessels average 1,090 TEU capacity
- Swire Shipping – North Asia Loop 2: Two vessels average 2,080 TEU capacity

Only the APL service operates U.S. flagged vessels which means it can carry freight from Guam/CNMI to the U.S. under the Jones Act regulations (See Figure 8-7). The other services carry international freight whose origin is non-U.S. and which is shipped directly to Saipan. Tinian and Rota are not served by these scheduled international services.

Figure 8-7: Indicative Service Calling Saipan



Source: APL

### 8.3. Passenger & Freight Projections

Passenger and freight projections are derived from trend expectations of the growth in visitors, based on the economic growth within the respective origin countries. Added to this is incremental growth stemming from increased capacity for tourist accommodation (i.e. new hotels and resorts) on the islands that will attract additional visitors above trend growth.

For the initial source of growth “trend projections”, economic growth within the core market is estimated to support trend growth in the number of visitors of 3.3% annually throughout the balance of the 15-year forecast period (2022 - 2037), following a higher 5% annual growth over the near-term (2017-2021). The supplementary source of growth, “incremental growth,” is derived from resort development. This is based on the assumption that over the next ten years, an additional 1,500 rooms will be available for tourist activity.

Real GDP growth in the nations which account for the majority of visitors to CNMI, namely China, Japan, Korea and Russia (the core nations) is projected to grow by a weighted 4.5% annually between 2017 and 2021. Assuming that the number of visitors continues to grow at 1.1-times the rate of GDP growth (the multiplier, average over the last three years) this would imply visitor growth of 5.0% annually. Longer-term, GDP growth is expected to slow to 3.0%, which would imply visitor growth to an average 3.3% annually over the period.

Table 8-1: Visitor Nation GDP and Visitor Growth

	2010	2011	2012	2013	2014	2015	2016E	2017E	2018E	2019E	2020E	2021E
<b>China</b>	10.6%	9.5%	7.9%	7.8%	7.3%	6.9%	6.6%	6.2%	6.0%	6.0%	5.9%	5.8%
<b>Japan</b>	4.7%	-0.5%	1.7%	1.4%	0.0%	0.5%	0.5%	0.6%	0.5%	0.7%	0.1%	0.6%
<b>Korea</b>	6.5%	3.7%	2.3%	2.9%	3.3%	2.6%	2.7%	3.0%	3.1%	3.0%	3.0%	3.0%
<b>Russia</b>	4.5%	4.0%	3.5%	1.3%	0.7%	-3.7%	-0.8%	1.1%	1.2%	1.5%	1.5%	1.5%
<b>Core GDP</b>	<b>8.2%</b>	<b>6.4%</b>	<b>5.8%</b>	<b>5.5%</b>	<b>4.9%</b>	<b>4.3%</b>	<b>4.6%</b>	<b>4.6%</b>	<b>4.5%</b>	<b>4.6%</b>	<b>4.5%</b>	<b>4.5%</b>
<b>Visitors</b>		340,957	401,219	438,908	459,240	478,592	506,762					
Visitor YOY%			<b>17.7%</b>	<b>9.4%</b>	<b>4.6%</b>	<b>4.2%</b>	<b>5.9%</b>	<b>5.0%</b>	<b>5.0%</b>	<b>5.1%</b>	<b>5.0%</b>	<b>5.0%</b>
Implied Multiplier			<b>3.1x</b>	<b>1.7x</b>	<b>0.9x</b>	<b>1.0x</b>	<b>1.3x</b>	<b>1.1x</b>	<b>1.1x</b>	<b>1.1x</b>	<b>1.1x</b>	<b>1.1x</b>

Source: IMF, CNMI, M&N

In addition to these trend projections, there is likely to be incremental jumps in the number of visitors associated with number of new resorts and casinos opening on the Islands. There are potentially three large scale developments that are considered in the visitor projections. These developments include:

Table 8-2: CNMI Resort Developments

Project	Size	Completion Date
<b>Grand Mariana</b>	373 Rooms	2018 (completed)
<b>Honest Profit</b>	300 Rooms	2018
<b>Puntan Diablo</b>	750 Rooms (Phase 1)	2021
<b>Titanic</b>	450 Rooms	TBD – Still under permitting

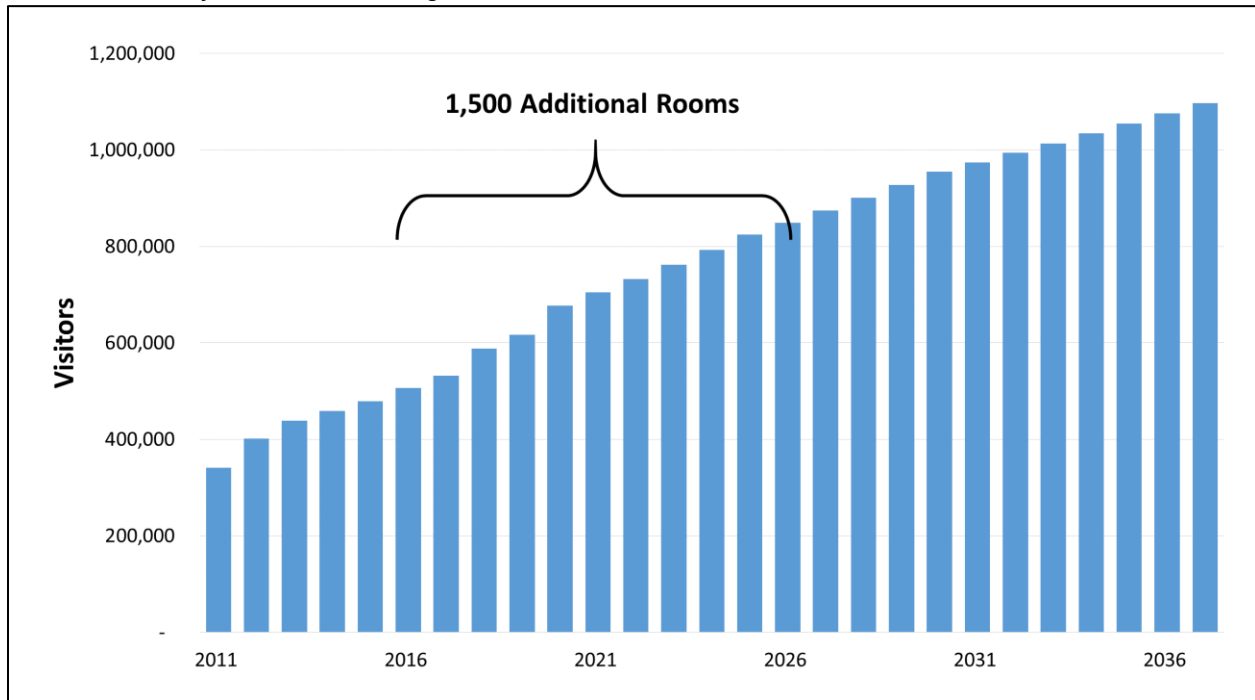
Source: M&N

The identified projects add approximately 1,500 rooms to the existing base (including the Grand Mariana). M&N has assumed that every 500 new rooms of additional capacity, translates into an extra 29,000–30,000 visitors, based on a 6-7 day duration.

The combination of the estimated trend growth (based on the GDP multiplier) and the addition of new capacity/visitors results in the visitor projections presented in Figure 8-8. Under these assumptions CNMI’s total visitors is projected to double from 2016’s 506,000 to 1.1 million by 2037.



Figure 8-8: Visitor Projections CNMI Tonnage

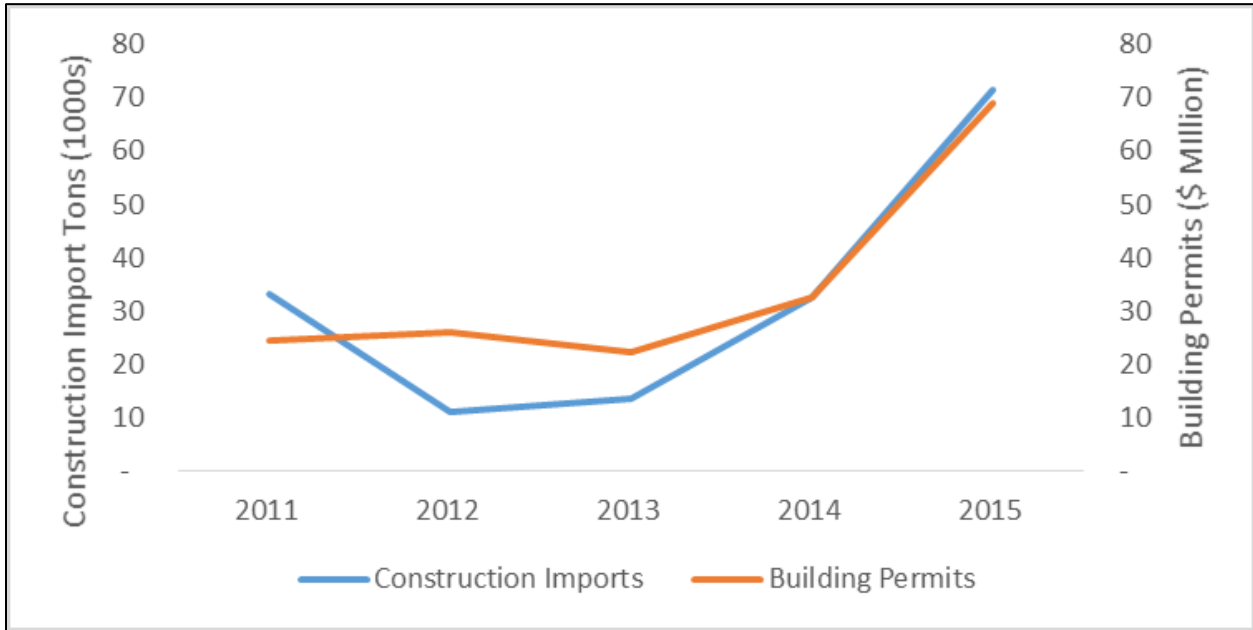


Source CPA; M&N

Based on the outlook for visitor growth to the island, projections of freight demand can be extrapolated. This is achieved through using an estimate of freight volume (tonnage per passenger). Historically, this volume has equated to 0.8 tons per visitor (import tonnage excluding construction related products – forecasted separately), based on the data provided by CPA.

To estimate the demand for construction related imports, these tonnages have been associated with future estimates of building permits. This analysis is based on the CNMI data which provides the historical value of building permits, and CPA’s data of “Construction Materials” and “Cement.” As can be observed in Figure 8-9, there has been a close correlation between the increases in the value of building permits (higher construction activity) with the increases in the volume of construction-related imports. Logically, as the level of construction activity rises, so should import requirements for building related products.

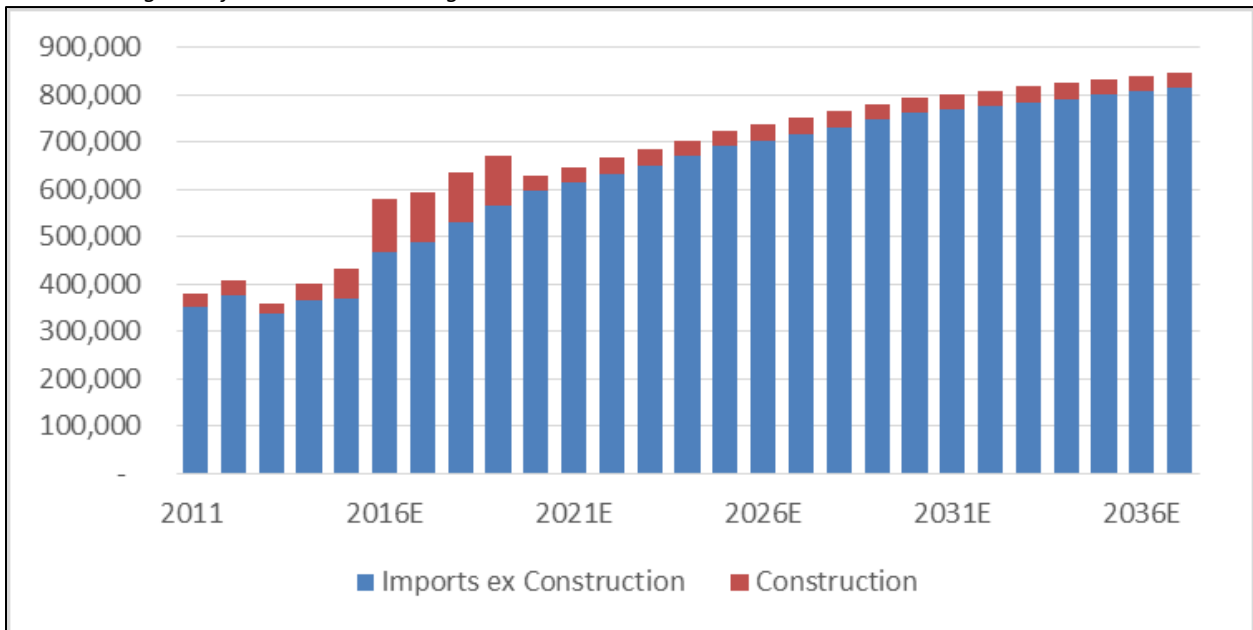
Figure 8-9: Construction Imports and Building Permits



Source: CNMI; CPA; M&N

The combined volume-growth of the projected import excluding construction and construction-related tonnage is presented in Figure 8-10. There are several years within the near-term in which construction related imports spike. This trend is indicative of the assumed 1,500 rooms of additional capacity coming on-stream. The trend growth thereafter suggests that total import volumes (tonnage) destined to CNMI will increase from 2016E's 500,000 tons to 850,000 by 2037.

Figure 8-10: Freight Projections CNMI Tonnage



Source: CPA; M&N

## 8.4. Passenger & Freight Projections Sensitivities

As part of the analysis M&N has produced a series of sensitivities (Base, High and Low) to the visitor projections and corresponding cargo volumes. The sensitivities are reflective of varying trends in organic visitor growth (related to economic performance in source nations) and number of new developments (additional rooms) which support incremental increases in visitor traffic. Additionally, M&N considered the forecasts being developed by GHD<sup>22</sup> as a potential scenario to be analyzed. These forecasts are part of GHD’s master planning effort for the Port of Saipan. In general the GHD projections appear to be more conservative than M&N’s and therefore for the purpose of this study they have been identified as the “Low-GHD” estimates of visitor and cargo volumes.

Table 8-3 presents a summary of the four scenarios being tested. The High sensitivity includes a 3.9% average projected increase in underlying organic visitor traffic. This coupled with an additional 3,000 rooms being constructed in the near-to-midterm (before 2025) would support total visitor traffic of 1.5 million by 2037 and corresponding cargo tonnage of roughly 1.1 million tons to CNMI as a whole. This assumption maintains the roughly 0.7 tons per visitor capita that has historically been observed in the islands.

Table 8-3: Summary of Sensitivity Assumptions

	Organic Visitor Growth (20-year Average)	Number of New Rooms by 2025	2037 Visitors (Estimated)	2037 Tonnage (Estimated)
<b>High</b>	3.9%	3,000	1,546,635	1,061,523
<b>Base</b>	3.3%	1,500	1,226,386	848,533
<b>Low-M&amp;N</b>	2.6%	500	787,013	556,316
<b>Low-GHD</b>	NA	6,000	1,221,415	469,401

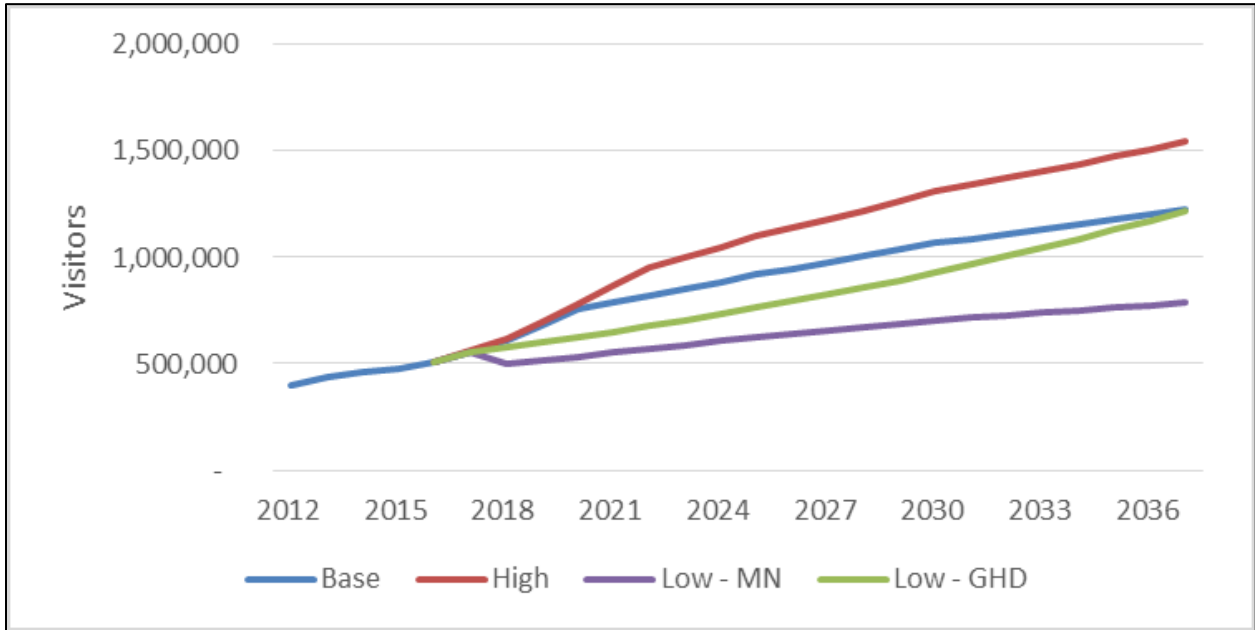
Source: M&N, GHD

The Low-M&N sensitivity includes a 2.6% average increase in underlying visitor traffic, and 500 additional rooms with no new development after 2017, reflecting a capital crisis in the funding nations. Passenger totals, by 2037, would reach roughly 787,000 and cargo tonnage 560,000 tons. The Low-M&N forecast maintains the base assumption of roughly 0.7 tons per visitor.

The Low-GHD estimate of freight is the most conservative. It shows two distinct periods of contraction, 2018 and 2026, indicative of declines in resort construction activity. These on average remove about 100,000 tons from the total tonnage. The four scenarios for CNMI in total (Base, High, Low-M&N and Low-GHD) for visitors and cargo are illustrated in Figure 8-11 and Figure 8-12 respectively.

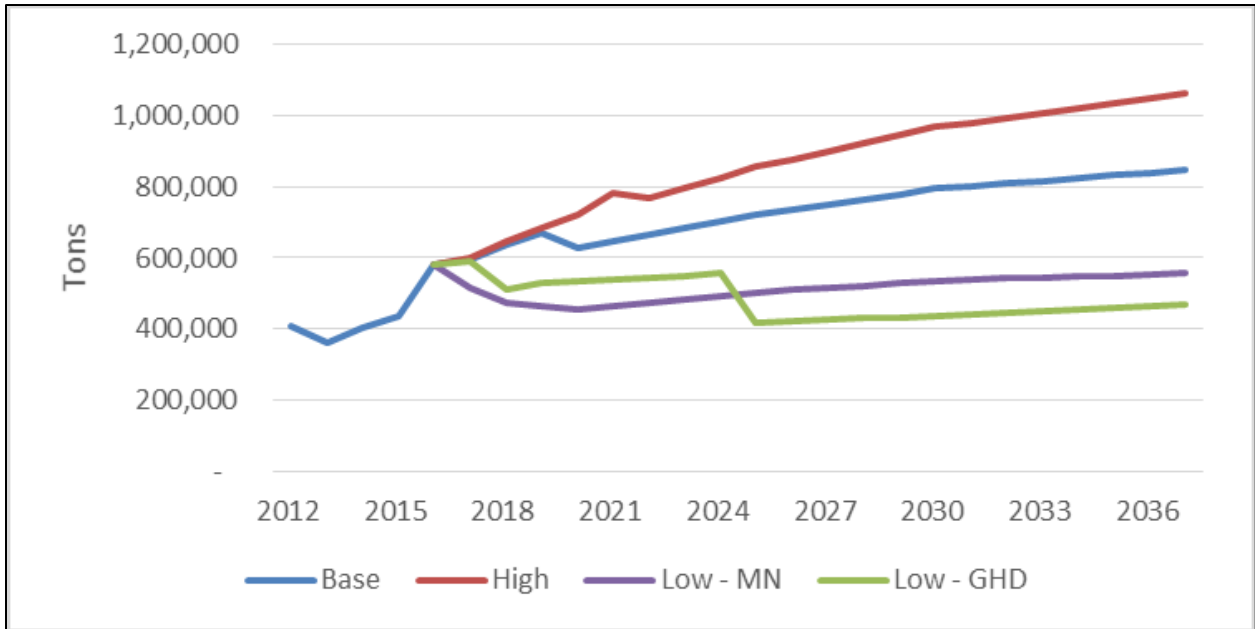
<sup>22</sup>GHD projections are through 2032, and M&N has extrapolated their 2032 growth rates out through 2037 for the purpose of comparison.

Figure 8-11: Visitor Projections CNMI Sensitivity



Source: CPA, M&N, GHD

Figure 8-12: Freight Projections CNMI Tonnage Sensitivity



Source: CPA, M&N, GHD

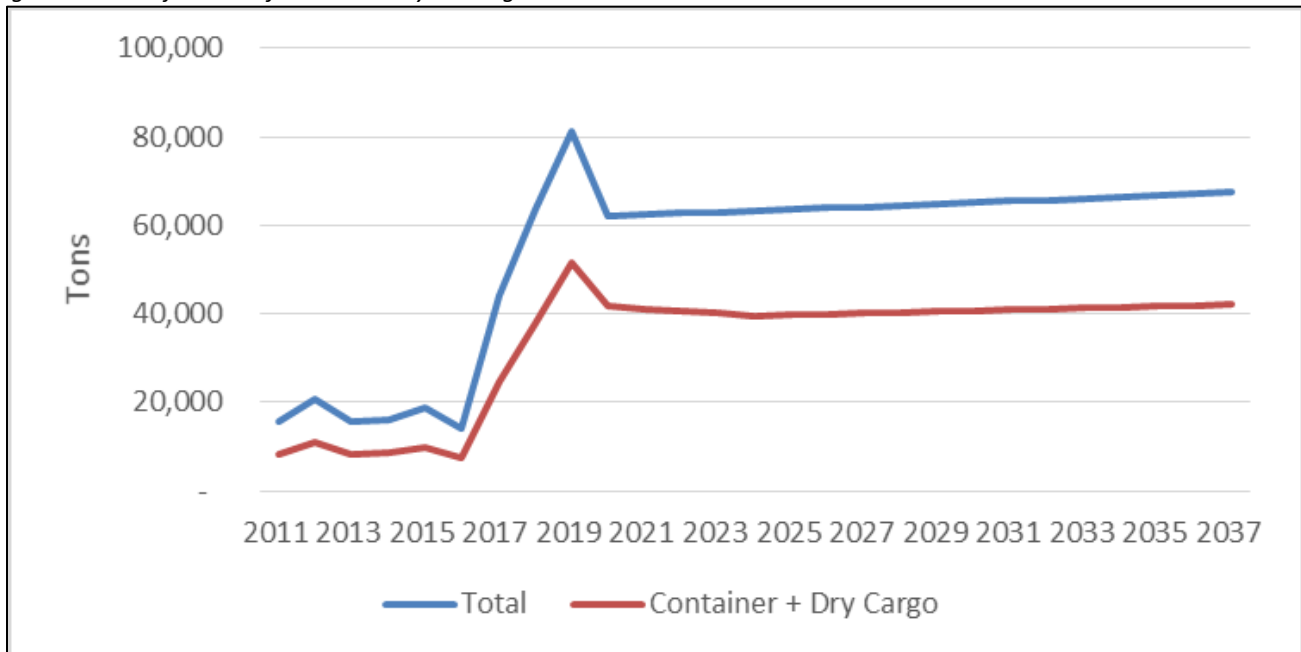
## 8.5. Implications on Tinian

As identified in Figure 8-6, Tinian has historically accounted for roughly 4% of the CNMI’s total trade volume. This share could increase should developments materialize, including the planned Titanic (BIG) and Puntan Diablo (ACG) resorts. Should Tinian maintain share of 4% to 10%, CNMI’s total demand would imply volume throughput ranging from roughly 25,000 - 80,000 tons per year by 2025. This compares to 2016’s (FY) total of 14,012 tons, of which 6,680 tons were fuel imports.

This level of volume is reflective of the per-capita based estimate. Assuming an incremental increase of roughly 81,000 visitors per year (above existing total of roughly 8,000), in addition to the local population base of roughly 3,000, brings long-term visitor/local population to roughly 86,000. With an average 0.7 tons per capita (which is inclusive of local population) this equates to roughly 60,000 tons.

Therefore, for the purpose of estimating the movement of dry cargo (containers, break bulk and dry bulk) the liquid bulk volume is removed from the projections. Traditionally liquid bulk volumes have accounted for roughly 40 - 50% of total tonnage at both Tinian, and the broader CNMI total. This same share is removed and the projections for dry cargo over Tinian are presented in Figure 8-13. It is assumed the container and other dry cargo account for 66% of the total volume as construction remains high between 2017 and 2020. This is to account for heightened share of construction related material imports. Following the completion of the construction surge, the share of container and dry is projected to remain above 60%, though liquid bulk imports do gain some as increased demand for electricity and fuels drive demand.

Figure 8-13: Projections of Total and Dry Tonnage at Tinian



Source: CPA, M&N

## 9.0 Financial Feasibility Evaluation

### 9.1. Financial Review Key Assumptions and Observations

For the purpose of evaluating the financial feasibility of redeveloping the commercial port facilities of Tinian, only the first phases of the project are considered. These first phases appear sufficient to accommodate future freight and passenger traffic in the near term, and provide the flexibility of expanding operating capacity in a phased program to grow as demand warrants. The following analysis places the projected cost of the respective developments within the available (existing and projected) financial resources the CPA has in place.

- Projected revenues generated by the port operations of Tinian alone are insufficient to cover the cost of the respective development projects. Therefore, revenues generated by the CPA's seaport activity in its entirety (Saipan, Tinian and Rota) should be considered. It is these revenues which have been used to historically support the payment on the existing Seaport Revenue bonds.
- The resort expansion projects will generate a proportion of the additional future demand. Other island developments, tourist, commercial and agricultural will also provide further impetus for incremental gains in passenger and cargo demand.
- ***The analysis is for illustrative purposes only and is not intended to provide a statement of future affordability and/or guidance as to how the CPA should proceed with their investment program. This can only be provided by a Registered Municipal Advisor<sup>23</sup>.***

### 9.2. Projected Revenues and Expenses

#### 9.2.1. Revenues

The CPA generates revenue maritime port operations at all three of the ports, namely Saipan, Tinian and Rota. These facilities serve as the gateways for freight and passenger traffic destined to/from the CNMI. As discussed in Section 8.2, the growth in future freight volumes is projected to be heavily influenced by continued development within the tourist industry, including the underlying organic growth in the tourist resident economies (of Asia and Guam) and incremental increases due to new large-scale resort/casino developments.

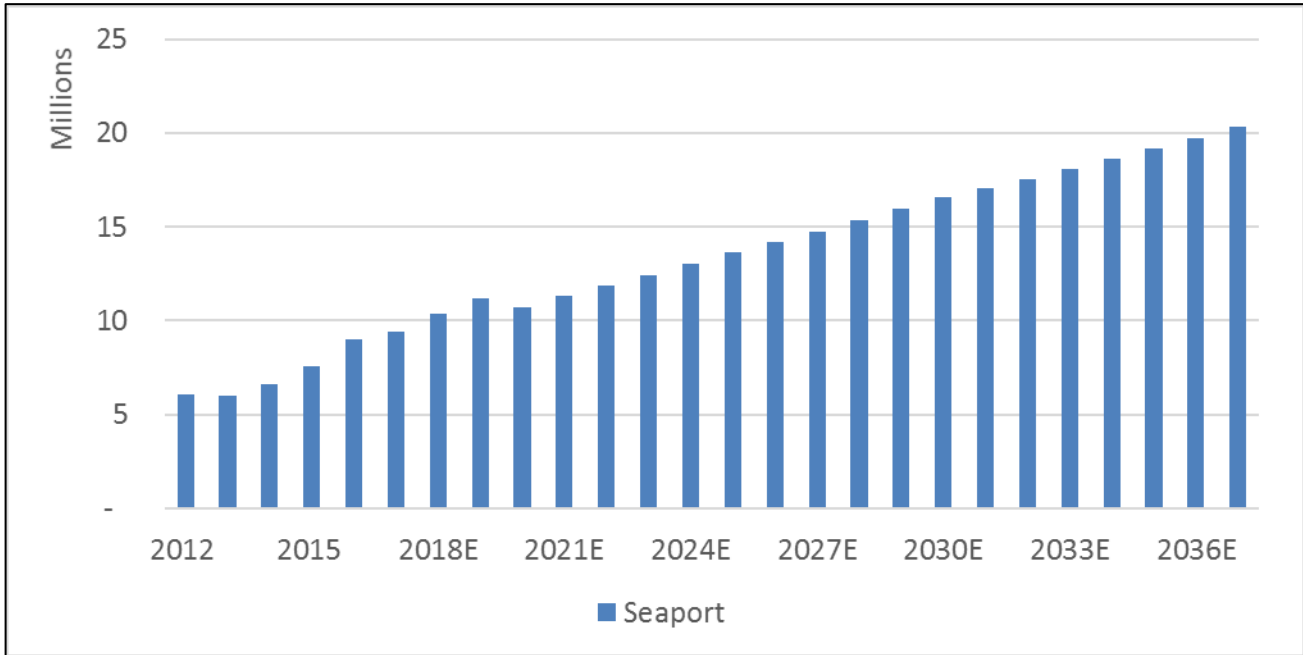
To estimate future revenues, M&N has relied on the audited financial statements obtained from the CPA to calculate the seaport revenues on a per ton of freight basis. In 2015, the seaport division generated \$7.6 million from handling 434,013 tons or \$17.47 per ton. It is assumed that future revenue projections are based on these per unit rates grown by U.S. inflation (an assumed 2% per annum) and applied to the respective passenger and freight volume projections.

Based on cargo projections of average 3.6% growth (2017–2037) and inflation of 2%, CPA seaport revenues could increase from \$9.0 million in 2016, to \$20.0 million by 2037. This is depicted in Figure 9.1, which shows the future development of seaport revenues.

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<sup>23</sup> <https://www.sec.gov/rules/final/2013/34-70462.pdf>

Figure 9-1: CPA Projected Revenues from Operations



Source: CPA; M&N

### 9.2.2. Expenses

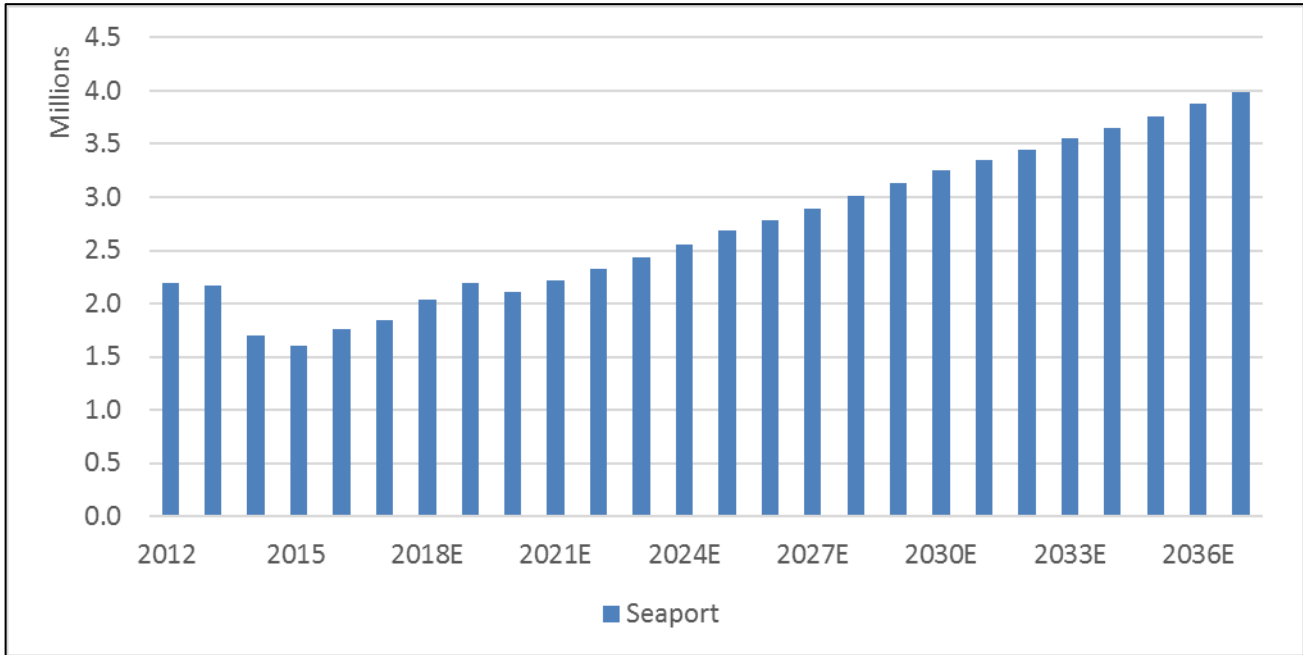
Projected operating expenses<sup>24</sup> are calculated using the same method as the revenues. The audited financial statements are used to calculate existing expenses on a per passenger basis (Airport) and per tonnage basis (Seaport). These existing costs are then grown at the same rate of US inflation (2%). M&N recognizes there could be sensitivity to the balance of fixed and variable expenses, but for the purpose of the analysis this approach is satisfactory. Operating expenses decreased between 2012 and 2014, partially as a result of lower energy costs (petroleum products) contributing to lower utilities expenses.

In 2015, CPA seaport operating expenses per ton equaled \$3.68 per ton (\$1.6 million in personnel and maintenance/operations expenses from 434,013 tons of cargo). Compared to the \$7.6 million in operating revenue generated by the seaports, the associated \$1.6 million indicates a relatively low cost operation (just 22% of revenues; M&N would note that as recently as 2011, expenses were 40% of revenues).

For forecasting purposes it is assumed that the per ton expense will grow at inflation. Thus the projected increase in volume (2017 – 2037) drives total operating expenses to \$4.0 mm by 2037 (20% of projected revenues).

<sup>24</sup> CPA includes depreciation and amortization within Operating Expenses, M&N excludes depreciation and amortization.

Figure 9-2: CPA Projected Operating Expenses



Source: CPA; M&N

### 9.2.3. Funds Available for Debt Coverage

For the purpose of the analysis, M&N has considered Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA) as the measure of income available for servicing CPA’s existing and future debt obligations. It is equal to operating revenues less operating expenses. The CPA does not calculate EBITDA but notes:

*“Management of CPA has determined that gross revenues consist of total operating revenues, other grant revenue and contributions, interest income and passenger facility charges to meet the indenture requirements.”*

Capital contributions and grant funding are difficult to quantify and therefore, estimated EBITDA is a proxy. As presented in Table 9-1, EBITDA in 2015 totaled an estimated \$6.0 million, and is projected to grow to \$15.4 million by 2035. This level of income, on an annual basis, is what is assumed to be available to cover CPA’s debt service requirements.

Table 9-1: Summary of Projected CPA Revenues, Expenses and EBITDA

	2015	2016E	2017E	2018E	2019E	2020E	2021E	2022E	2023E	2024E	2025E	2030E	2035E
<b>Revenue</b>	7.58	8.98	9.38	10.35	11.17	10.73	11.29	11.84	12.42	13.03	13.66	17.55	19.16
<b>Expenses</b>	1.60	1.76	1.84	2.03	2.19	2.11	2.22	2.33	2.44	2.56	2.68	3.25	3.76
<b>EBITDA</b>	5.98	7.21	7.54	8.32	8.98	8.63	9.08	9.52	9.98	10.47	10.98	14.30	15.39

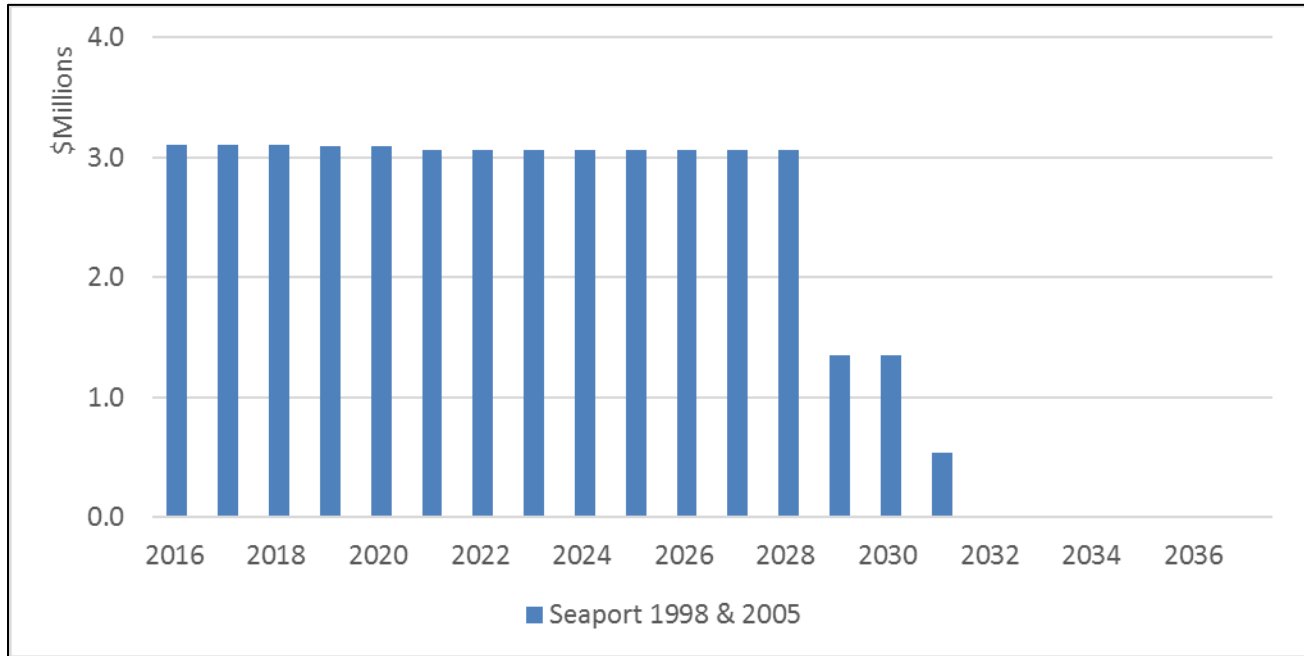
Source: M&N



### 9.3. Existing CPA Debt Requirements

The CPA’s existing debt obligations<sup>25</sup> consist of two outstanding bond issues the 1998 Seaport Revenue issue (\$33.78 million) and 2005 Seaport Revenue issue (\$7.23 million). Combined, the debt requirement will total \$3.1 million per annum between 2017 and 2025, at which point the 1998 seaport issue is retired in 2028 followed by the 2005 issue in 2031.

Figure 9-3: CPA Existing Debt Schedule



Source: CPA

Recent revenues and expenses generated by CPA seaport operations appear to be supportive of the existing debt service coverage ratio (DSCR). The debt covenant states that monies available to cover debt payments must be 1.25 times the level of the payment in a given year. As illustrated in Figure 9-4, the EBITDA generated from seaport operations in 2012, 2013, 2014, and 2015 achieved DSCR of 1.25 or greater. In 2015, operations produced an estimated 1.9 times DSCR, well above the required 1.25 times. This is reflective of an existing sizable buffer between monies available to cover the annual debt obligations, supported by a strong upswing in volume growth in 2014 and 2015.

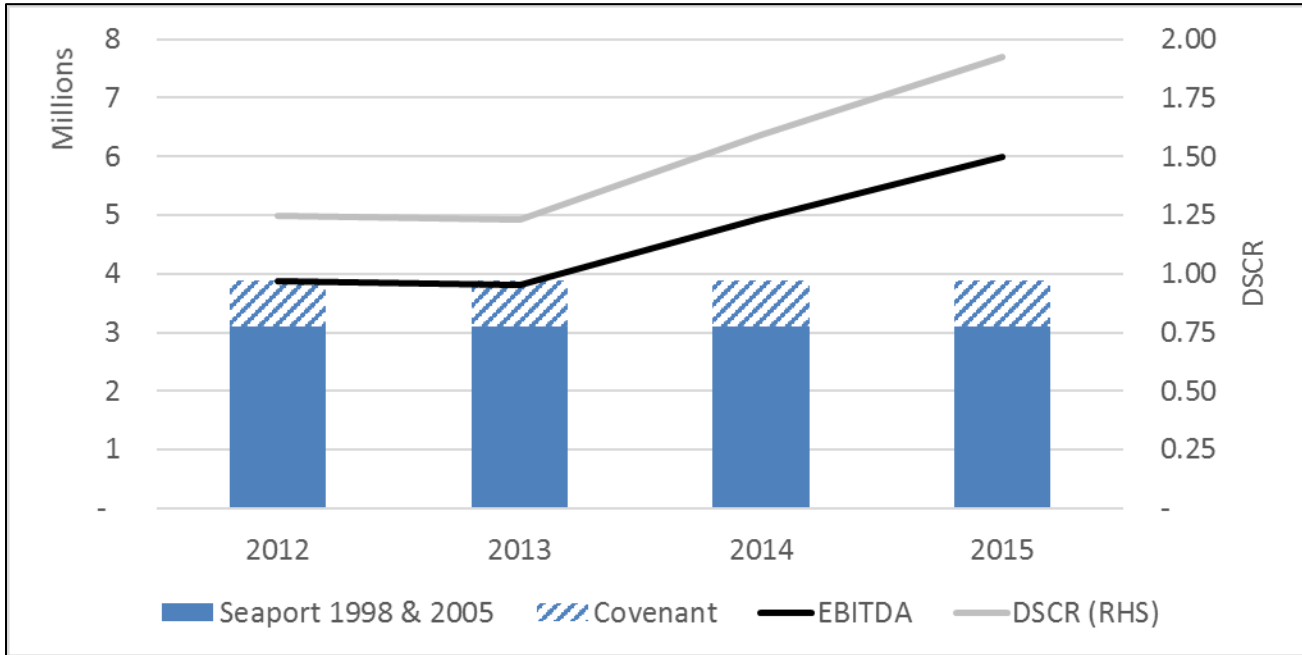
MN would note however, that as recently as 2012 EBITDA generation was just sufficient to cover the debt requirement in that year. This had been a weaker year in terms of visitors as volume growth, still in the last years of the recession-recovery, and underscores the sensitivity of EBITDA generation during times of low economic growth.

***The analysis is for illustrative purposes only and is not intended to provide a statement of future affordability and/or guidance as to how the CPA should proceed with their investment program. This can only be provided by a Registered Municipal Advisor<sup>26</sup>.***

<sup>25</sup> Does not include subordinated Promissory Note

<sup>26</sup> <https://www.sec.gov/rules/final/2013/34-70462.pdf>

Figure 9-4: CPA Existing Debt versus DSCR



Source: CPA

#### 9.4. Tinian Port Development

As addressed in Section 6.2, the development of the Tinian harbor would follow a three-phased approach, with each subsequent phase adding more handling capacity. Based on the concept proposed, estimated costs for the respective phases are:

- Phase 1 – \$12.3 million (Bulkhead repair, Ro-Ro ramp, upland renovation)
- Phase 2 – \$38.2 million (Bulkhead repair/encapsulation, tanker manifold, connecting pier upgrade, demolition of Finger Pier A)
- Phase 3 – \$60.6 million (Cutoff wall and fill, South Quay Berth 5 & 6, utilities and other)

Note: These estimates do not include funds for breakwater and dredging improvements. These are expected to be funded by Corps. All costs do include estimates of mobilization, contingency, permitting and environmental mitigation.

Table 9-2 presents the hypothetical annual payments associated with respective development phases. For example, if a revenue bond were issued to cover the cost of the Phase 1 development of \$12.3 million, two years from now, the cost of the project + the funds needed to be kept in reserve (estimated at \$2.8) would result in an annual debt payment of \$2.6M in 2018. Similarly, costs associated with Phase 2 (\$38.2M), beginning in 2025 (\$48.8M after inflation and including \$7.4M in reserve), and if this were a 20-year bond would require annual payments of \$5.7 million.

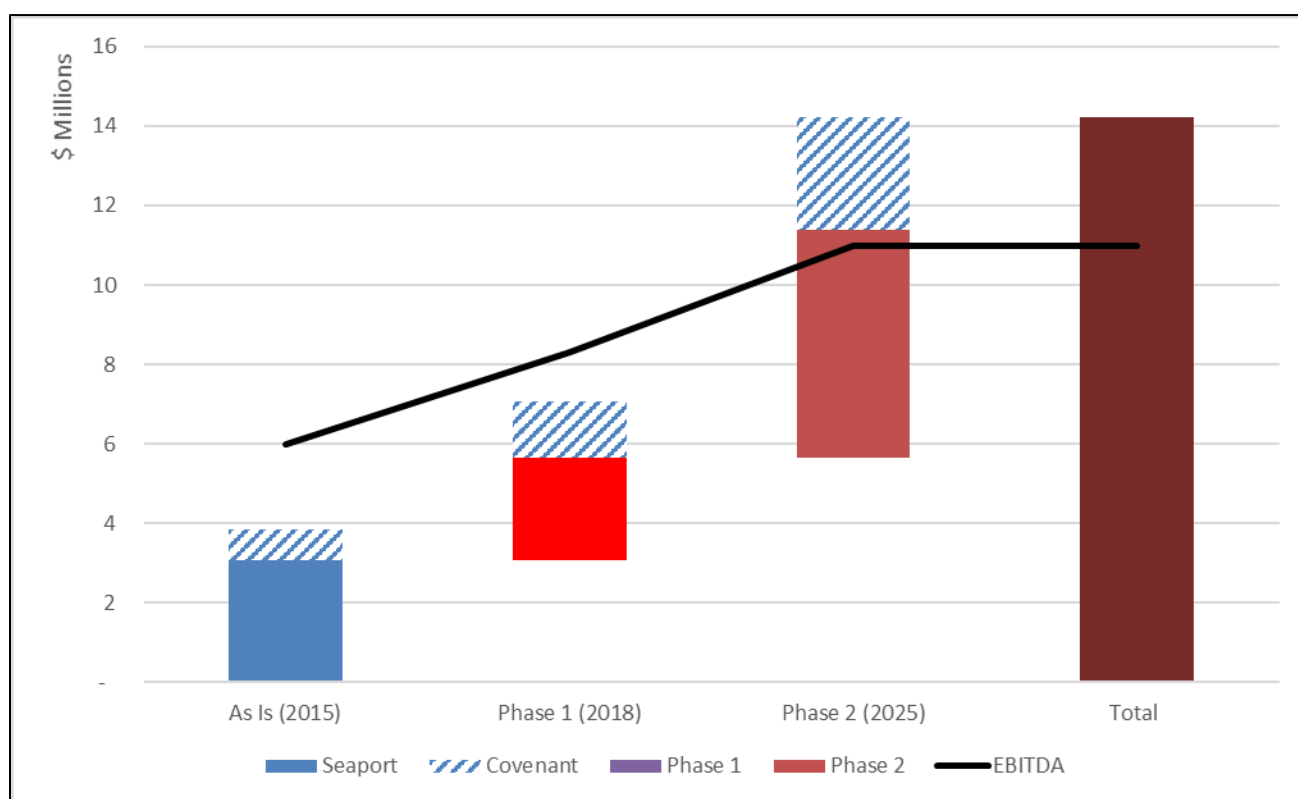
Table 9-2: Illustrative Borrowing Needs (\$Millions)

	Phase 1	Phase 2	Phase 3
<b>Project Date</b>	2018	2025	2030
<b>2016 U.S. Dollar Cost</b>	12.3	38.2	60.6
<b>Inception Date U.S. Dollar Cost</b>	15.91	48.78	98.07
<b>Illustrative Bond Rate</b>	10.0%	10.0%	10.0%
<b>Illustrative Term (Years)</b>	10	20	20
<b>Estimated Annual Obligation</b>	2.58	5.73	11.50

Source: M&N

Therefore, in comparing these projected annual payments with the trend projections of EBITDA (2018 and 2025), it would appear that debt coverage (interest payments) will be possible, for the Phase 1 project, but Phase 2 may become constrained, and an alternate source of funding could be required.

Figure 9-5: Implied Annual Debt Service Requirements and EBITDA



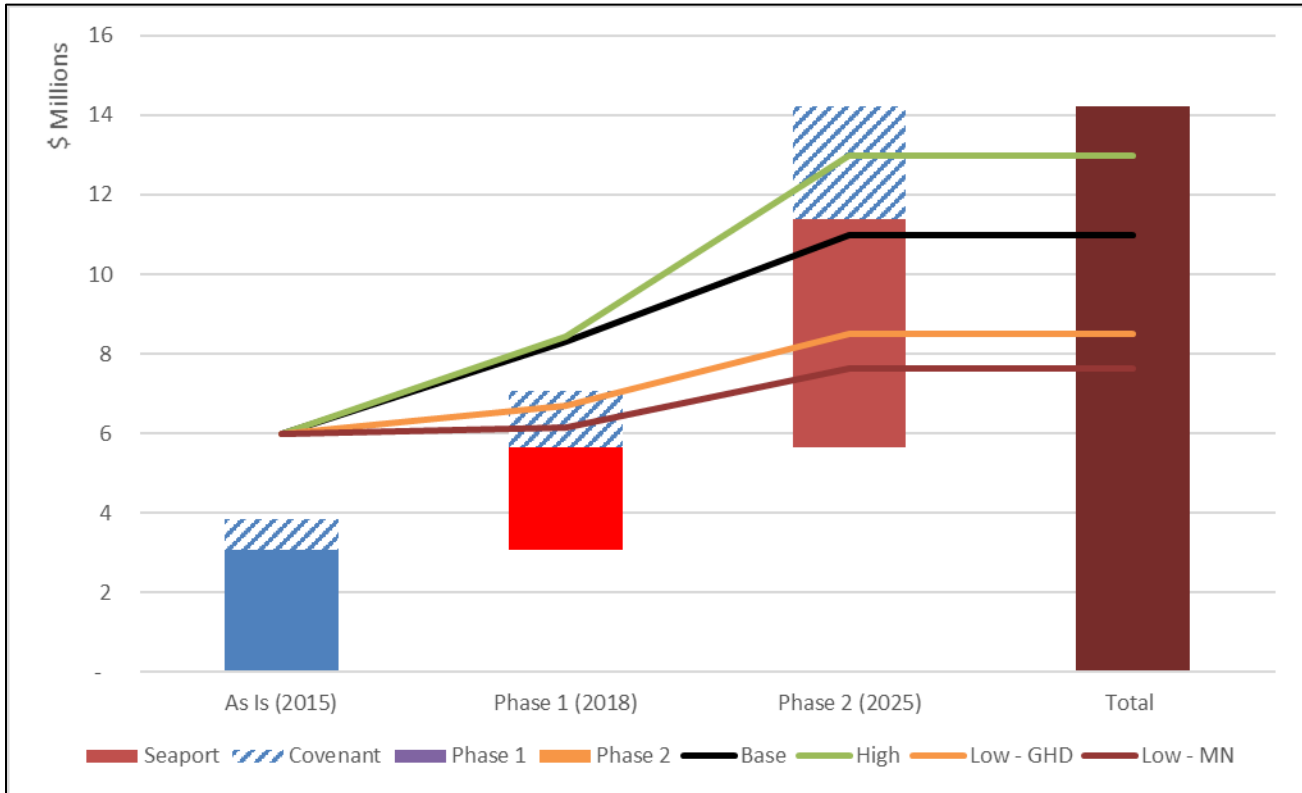
Source: CPA; M&N

M&N notes that a similar analysis was conducted on the CPA's finances in 2013, and the history shows that during the Global Financial Crisis of 2008/2009 debt coverage became strained as EBITDA declined. Whilst the more recent analysis presented appears supportive, it should be noted that during periods of economic weakness, financial conditions can change significantly, impacting investment fundamentals. The sensitivities are illustrated in Figure 9-6.

These sensitivities are reflective of the Base, High and Low visitor and volume projections. As noted, the Phase 1 option appears feasible under Base scenario, as well as the High and Low projections (M&N and GHD). Phase 2 may not be totally self-funded under the Base scenario, appears to be at risk of coverage under the Low- M&N

and Low-GHD scenarios. This indicates that debt payments could not be made should weak visitor and cargo volume growth materialize. Only under the High set of assumptions is Phase 2 appear entirely self-fundable through CPA financed debt<sup>27</sup>, but even then the 1.25 DSCR may not be achievable.

Figure 9-6: Implied Annual Debt Requirements and EBITDA Sensitivity

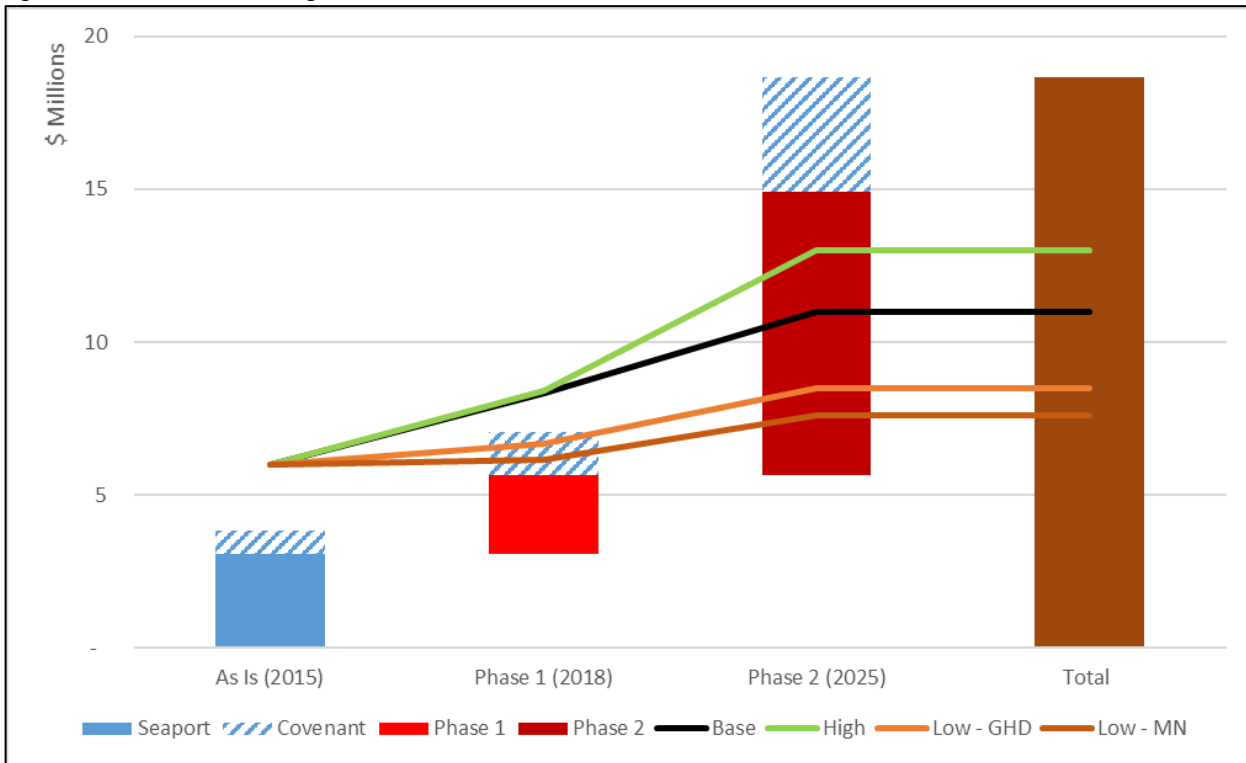


Source: CPA; M&N

In addition to the sensitivities presented in Figure 9-6, M&N ran an analysis to reflect the incremental cost of the breakwater construction in Phase 2. Assuming that CPA would be responsible for 25% of the total estimated \$83M this would imply an additional \$21M funding requirement in 2025. As illustrated in the figure above, this new debt load would be challenging for the CPA to cover under even the optimistic scenario, and would likely necessitate outside funding to help support the development.

<sup>27</sup> M&N is not a certified Financial Advisor and therefore, the analysis is for illustrative purposes only

Figure 9-7: CPA Debt Coverage with Breakwater



Source: CPA; M&N

M&N would note that the analysis does not take into consideration the cost of other capital improvement projects that the CPA may be considering, either at the ports of Saipan and/or Rota. Should there in fact be other large scale infrastructure projects being considered, the ability to fund these may require monies from outside sources as the projected EBITDA may not be enough to cover additional debt requirements.

DoD could potentially serve as one of the outside sources of capital. As Tinian is a facility that serves/is utilized by both the local population and DoD, the CPA could be in a position to negotiate with the DOD for assistance in the development of Tinian Harbor.

## 10.0 Conclusions

Tinian Harbor is the primary lifeline for the residents of Tinian. However, its facilities were constructed over 70 years ago and are now in need of renovation and reconfiguration. Additionally, increased use by the U.S. DoD and the development of hotel and gaming on Tinian have put additional stress on the port's aging infrastructure and capacity.

The immediate risk to the harbor is the potential for near-term failure of the existing quay wharf structure, which could result in significant disruption to the delivery of fuel and supplies to the island. However, another challenge is the encroachment and constraint of the terminal by multiple small projects that seek to be located immediately adjacent to the existing facility.

Therefore, the CPA must follow a plan that will ensure the continued functionality of the North Quay through a phased approach that addresses immediate needs first, but not in a way that precludes mid-term and long term development of the port.

The principal recommendations of this Master Plan include:

1. Develop a second tanker berth at Berth 3 that can be used when Berth 2 is occupied by cargo vessels. This is particularly important before the breakwater is repaired, as Berth 3 may experience too much wave action for lifting cargo by crane.
2. Repair the existing terminal lighting and other facilities so that when a vessel arrives, it can be serviced expeditiously.
3. Establish near-dock uses that only include water-dependent activities that must be within the terminal fence line. Take a strong stance against locating new facilities where they could impede future development.
4. Develop a functioning ferry berth under the control of CPA. This will ensure that cargo and passengers have access to the island regardless of conditions at other proposed ferry berths.
5. Renovate the existing North Quay as soon as financially feasible in order to avoid a much costlier catastrophic collapse of the structure.
6. Provide improved facilities for recreation and small boat use off of the terminal. Ensure that a concessionaire is on-site to administer the facility.
7. Construct seawater fire suppression system at the port to allow tanker operations without calling a firetruck from the airport.

In addition, the CPA will need to work with the U.S. Army Corps of Engineers to develop an affordable plan for replacing the harbor breakwater and performing maintenance dredging. Although the Corps will dredge the entrance channel and turning basin, it will be the CPA's responsibility to dredge the berthing areas.

If only Phase 2 of the Master Plan is constructed, and if a new breakwater is built by the Corps, then Tinian will have one of the finest harbor facilities in the Western Pacific. With the Phase 3 South Quay development, and additional harbor dredging, Tinian could host a broad spectrum of future DoD missions including DoD disaster relief pre-positioning, Marine Corps training exercises and other future uses in support of Western Pacific operations.

## **Appendices**

- Appendix A** Assessment of the Tinian Harbor, Capital Improvement Program, Commonwealth of the Northern Mariana Islands, prepared by Moffatt & Nichol, May 2015
- Appendix B** Tinian Harbor Master Plan Project Permitting and Environmental Mitigation, prepared by Micronesian Environmental Services, November 2017
- Appendix C** Commonwealth of the Northern Mariana – Capital Improvement Program, Tinian Harbor Terminal Master Plan, Opinion of Probable Construction Cost – Conceptual Design Level
- Appendix D** “*Notes of Meeting*” for Tinian Harbor Master Planning Services (Project No. CPA-TS-001-15)
- Appendix E** Disclaimer and Acknowledgement
- Appendix F** References and Previous Reports

**Appendix A Assessment of the Tinian Harbor, Capital Improvement Program,  
Commonwealth of the Northern Mariana Islands, prepared by  
Moffatt & Nichol, May 2015**



# ASSESSMENT OF THE TINIAN HARBOR

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Capital Improvement Program  
Commonwealth of the Northern Mariana Islands

FINAL SUBMITTAL



Prepared by:  
**Moffatt & Nichol, Honolulu, HI**

In Association with:  
SSFM CNMI, LLC, Saipan, CNMI  
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May 2015

## ASSESSMENT OF THE TINIAN HARBOR

For: Commonwealth of the Northern Mariana Islands

Date: May 2015

Report/Revision	Date	Author	Reviewed	Approved	Description
1	30 Nov 2014	Team	Dick Chan		Working Draft
2	16 Dec 2014	Dick Chan	Brian Enomoto		60% Submittal
3	01 May 2015	Dick Chan	Brian Enomoto		Final Submittal

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## Glossary of Acronyms and Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
AAV	Amphibious Assault Vehicle
AC	Asphaltic Concrete
ACI	American Concrete Institute
API	American Petroleum Institute
ASCE	American Society of Civil Engineers
BECQ	Bureau of Environmental and Coastal Quality
BiOp	Biological Opinion
BW	Boussinesq Wave
CATEX	Categorical Exclusion
CDF	Control Density Fill; Confined Disposal Facility
CIP	Capital Improvement Program; Cast-in-place
CNMI	Commonwealth Of The Northern Marina Islands
CPA	Commonwealth Port Authority
CRED	Coral Reef Ecosystem Division
CWA	Clean Water Act
cy	Cubic Yard
CZMA	Coastal Zone Management Act
DEM	Digital Engineering Model
DFW	Division of Fish and Wildlife
DHI	Danish Hydraulic Institute
DOD	Department of Defense (U.S.)
DWT	Dead Weight Tonnage
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
EV	Environmental
FBD	Freeboard
ft	Feet
GT	Gross Tonnage
HHWL	Higher High Water Level
HAT	High Astronomical Tide
HWL	High Water Level
IBC	International Building Code
IPCC	Intergovernmental Panel on Climate Change
ISO	International Standards Organization
ITB	Integrated-Tug-Barge (cargo vessel)
IWDS	Individual Waste Water Disposal System
JHSV	Joint High Speed Vessel
kg	Kilograms
LAT	Lowest Astronomical Tide
LRFD	Load and Resistance Factor Design
LLWL	Lower Low Water Level
LOA	Length Overall
LWL	Low Water Level



m	Meters
M&N	Moffatt & Nichol
MARFORPAC	Marine Force Pacific
MHHW	Mean Higher High Water
MHW	Mean High Water
MLLW	Mean Lower Low Water
MLW	Mean Low Water
mm	Millimeters
MMPA	Marine Mammal Protection Act
MMT	Marine Monitoring Team
MSL	Mean Sea Level
MTL	Mean Tide Level
MSC	Military Sealift Command (U.S.)
MSL	Mean Sea Level
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOAA	National Oceanic And Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
OPCC	Opinion of Probable Construction Cost
PIANC	Permanent International Association of Navigation Congress (World Association for Waterborne Transport Infrastructure)
psf	Pounds Per Square Foot
psi	Pounds Per Square Inch
ROM	Rough Order of Magnitude
RSLC	Relative Seal Level Rise
SLR	Sea Level Rise
SSP	Steel Sheet Pile
TEU	Twenty-foot Equivalent Unit
UFC	Unified Facilities Criteria
USACE	U.S. Army Corps of Engineers
USCG	United States Coast Guard
USEPA	U.S. Environmental Protection Agency
USFWS	U.S Fish and Wildlife Service
UXO	Unexploded Ordnance
WFI	Waterfront Facility Inspection
WIS	Wave Information Study
WGS84	World Geodetic System 1984
WQC	Water Quality Certification
WWII	World War II

## Executive Summary

### INTRODUCTION AND BACKGROUND

Moffatt & Nichol (M&N) was retained by the Commonwealth of the Northern Mariana Islands, Capital Improvements Program (CNMI/CIP) Office to develop the necessary scope of improvements to the existing Tinian Inner Harbor facilities (piers and quays) to meet the anticipated future uses of the harbor, and to provide a road map on the implementation of the recommended improvements.

Construction of the original harbor facilities were completed in March 1945. These facilities include a breakwater comprised of a combination of filled circular cell cofferdams and straight sheet pile bulkhead walls, as well as inner harbor Finger Piers, Connecting pier, North Quay and East Quay consisting of tied-back steel sheet pile bulkhead walls. The aforementioned elements of Tinian Harbor are shown in Figure E-1.

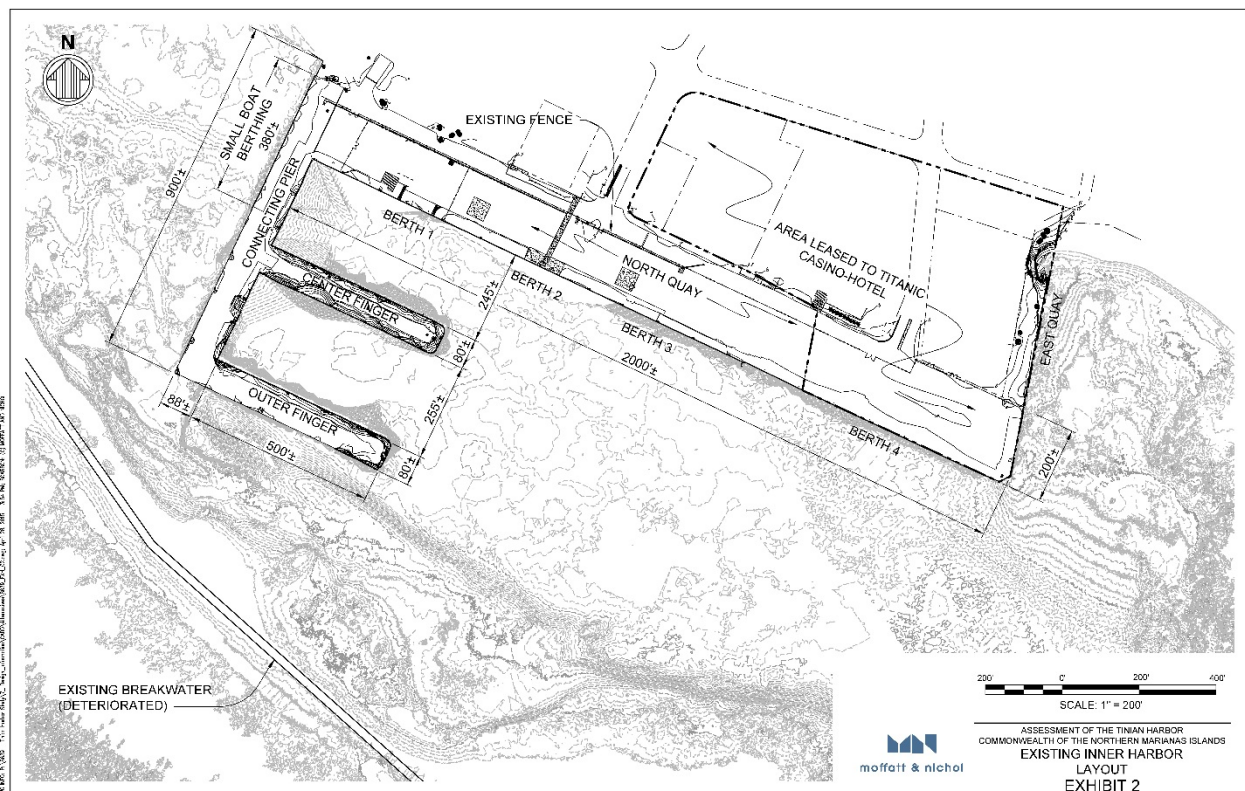


Figure E-1 – Tinian Harbor Layout Plan

Over the years, the harbor facilities have been deteriorating and various structural repairs were made to the existing inner harbor pier and quay wall structures, including reconstruction of the concrete cap beams on various sections of the bulkhead walls, and most recently the installation of new fenders and mooring bollards at the Mobil fueling berth (Berth 2 at the North Quay).

A Harbor Master Plan prepared in 1997 for Commonwealth of the Northern Mariana Islands/Commonwealth Port Authority (CNMI/CPA) described the finger piers and the connecting pier as being badly deteriorated and in need of repairs. A 2009 harbor study discovered that all components of the harbor were severely deteriorated, and that a majority of the breakwater sheet piles had collapsed and are no longer effective in protecting the harbor. The scope of this study covers the inner harbor, including Finger Piers, Connecting Pier, North Quay and East Quay. The breakwater is currently under review and evaluation by the US Army Corps of Engineers (USACE) and is not included in this study.

## **SITE AND EXISTING CONDITIONS**

This study performs an above-water and underwater field inspection of the inner harbor facilities, a geotechnical investigation of the soils behind the bulkheads, a topographic survey of the site, and a coastal engineering evaluation to characterize the metocean conditions at the site. This study also includes a review of available reference materials including record plans, a recent hydrographic survey of the harbor, various condition assessment reports, and historic repair drawings. To supplement the study, two (2) meetings were held in Saipan to meet with project stakeholders to solicit their input on the future operational needs of the harbor. The study team was informed of the leasing of majority portion of Berth 4 in the North Quay and the East Quay (collective called East Quay by CPA) to others for the development of the Titanic Casino and Hotel complex. Improvements to the leased portion of Berth 4 in the North Quay and the East Quay will not be included in this study; however, approximately 160 linear feet of Berth 4 remains outside of the limits of the leased area and are considered in the scope of the current study.

Coastal engineering evaluation was performed based on the current conditions of the breakwater and considering tidal variations, sea level rise (SLR) and wave effect during storm events. Based on the current deck elevation of approximately 8.5 feet MLLW, the evaluation concludes that overtopping is likely at Berth 4 in the North Quay during storm events with return period greater than 2 years. However, at other parts of the inner harbor, including the Finger Pier area, overtopping is less likely during most storm events.

## **ASSESSMENT AND RECOMMENDED PROJECT SCOPE**

Field inspection and discussion with CPA staff confirmed that Berths 1, 2, and 3 of the North Quay and the northwest portion of the Connecting Pier are actively being used. Every effort should be made to keep these usable inner harbor facilities operable. Berth 2 is actively used by Mobil, and the mooring and fender systems have been upgraded and the concrete cap beam was repaired in 2011. Berths 1 and 3 are also being used occasionally. However the mooring and fender systems at Berths 1 and 3 are either under-capacity, deteriorated or non-existing and are not adequate to support the berthing of vessels similar to or larger than the tankers visiting the Mobil berth. This study recommends that the fender and mooring systems at Berths 1 and 3 be upgraded under Phase 1 if Berths 1 and 3 are expected to be used to berth relatively large vessels. Concerns about operational loadings and structural capacities of the North Quay berths are discussed in the next paragraph below. The portion of Berth 4 that is outside of the leased area, as well as the Finger Piers and part of the Connecting Pier have outlived their respective service lives and are not suitable for mooring and berthing activities or to support vehicle or cargo loads. It is recommended to modernize the facility by reconfiguring and replacing the Finger Piers and to renovate the western end of Berth 4 and the east face of the Connecting Pier under Phase 1.

Structural capacities of the existing quay walls and piers were evaluated using information from available drawings and the results of the field inspection. Due to the limitations in available record or as-built drawings,

a methodology was developed to establish the possible as-built conditions of the structure and structural capacity based on commonly accepted design criteria and standards for steel sheet pile bulkheads at the time of the original design. Since the tie-rod system is a key component that affects the structural performance of the steel sheet pile bulkhead, it is recommended that representative pit excavations behind the existing bulkheads be performed to expose the tie-rods and their anchors to verify their sizes and conditions. Depending on the results of this survey, additional structural evaluation of the existing bulkheads will be required to validate their continued use.

The evaluation of the existing corroded bulkhead structures at the North Quay estimated that the sheet piles are approximately 40% overstress when considering a surcharge load of 250 psf placed at close proximity to the face of the bulkhead (modern wharf criteria would recommend designing for 600 psf minimum). By inspection, a major seismic event further increase the lateral load demand on the sheet pile wall and would significantly overload the wall and result in major damage. It is worthwhile noting that minimal seismic loading was considered at the time of the original design. This study recommends strengthening or replacement of the bulkheads along the North Quay under Phase 2. These strengthened or replaced bulkhead shall be designed to meet the current design codes which include seismic requirements. To continue operations on the North Quay, load restrictions shall be imposed on the wharf in addition to upgrading the mooring and fendering systems under Phase 1 as discussed above.

For new pier and quay wall construction, it is desirable to set the pier deck at +10.0 ft MLLW to minimize overtopping conditions.

The existing facility does not provide utility services at the berths. The harbor modernization under Phase 1 and Phase 2 will include planned improvements such as water, fire protection, lighting and drainage. New pavements will be designed for typical highway truck loads, 10 ton forklifts, 50 ton mobile cranes, and uniform deck loads of 600 psf.

The modernized Tinian Inner Harbor will be able to host a variety of vessels, ranging from general or containerized cargo vessels, oil tankers, passenger ferries, cruise ships, and military vessels including the Joint High Speed Vessels, Integrated Tug and Barge, Landing Craft, tug boats, and other small crafts. Based on the findings of this study, design vessels will range in length from less than 100 feet up to approximately 550 feet, in beam from 25 feet to approximately 100 feet, and in draft up to 26.5 feet.

To accommodate the larger class of vessels that may visit Tinian Harbor in the future, dredging is required. Dredge depths were investigated for both a continuous -30 ft MLLW channel and turning basin/berth as well as a combined -30 ft MLLW approach channel with -28 ft MLLW turning basin/berth. Dredge volumes vary depending on dredge depths and the alternative selected below and bathymetry, which will vary over time due to additional shoaling. To minimize construction costs, this study recommends dredging a -30 ft MLLW approach channel and a -28 ft MLLW turning basin/berth.

The total amount of dredge material, including a one foot overdredge allowance, would vary between 230,000 cubic yards (cy) to 400,000 cy. Suitable dredge material will be used to construct the reconfigured Finger Piers and the balance of the dredge material will be disposed of in an upland disposal site. Two abundant quarry sites have been identified as potential disposal areas able to accommodate the anticipated dredge material volume as described in the report. To minimize the volume of off-site disposal, between 125,000 and 215,000 cy of the dredge material potentially could be reused. Dredge material would require processing to remove or crush large rock prior to being used as fill in the Finger Pier reconstruction.

The Tinian Harbor facilities were used extensively during WWII to transfer war munitions cargo. It is possible that both additional cluster bombs and other smaller unexploded ordinance (UXO) exist buried in the seabed and scattered in the basin. Dredging and sheet pile driving may disturb buried UXO, and it is recommended that surveying and monitoring for UXOs be completed in the affected areas ahead of any construction activities.

**HARBOR LAYOUT RECOMMENDATIONS**

The study investigated three (3) alternative layouts for the modernized harbor. Alternative 3 is as shown on Figures E-2, E-3 and E-4.

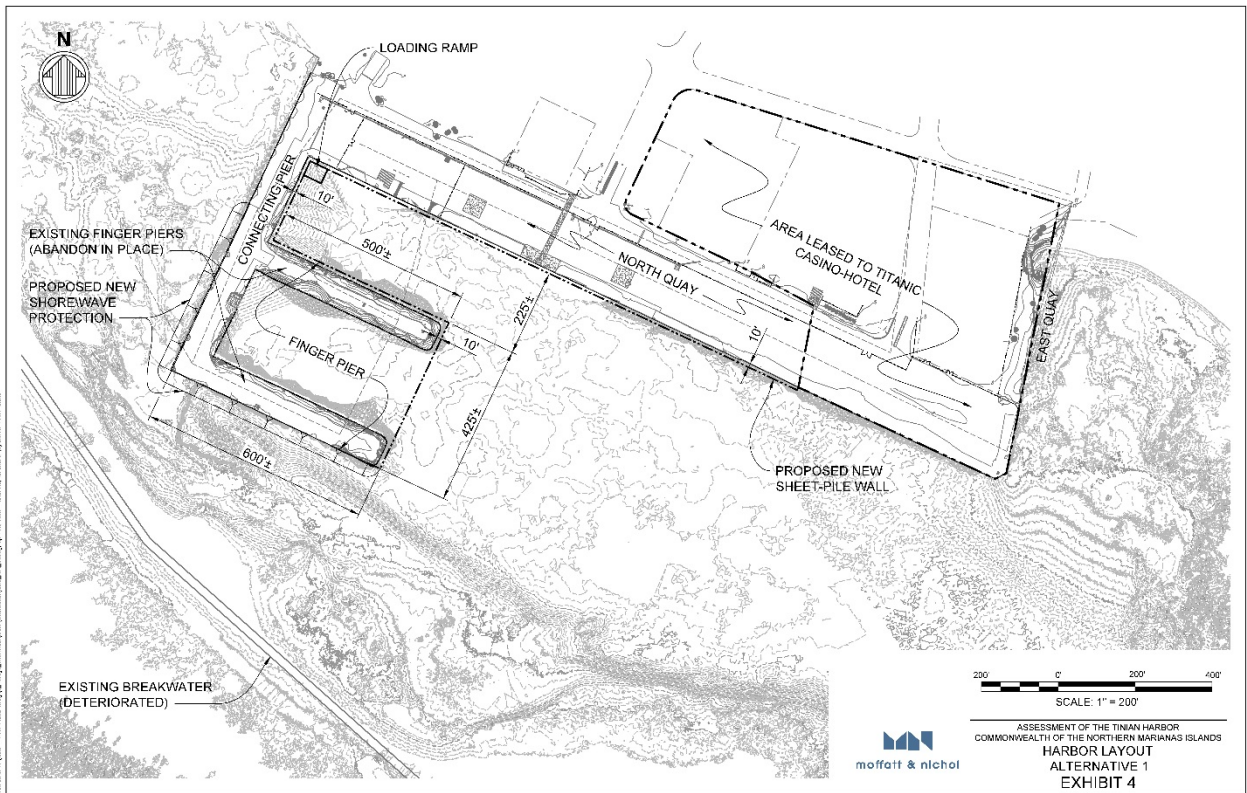


Figure E-2 – Harbor Layout Alternative 1

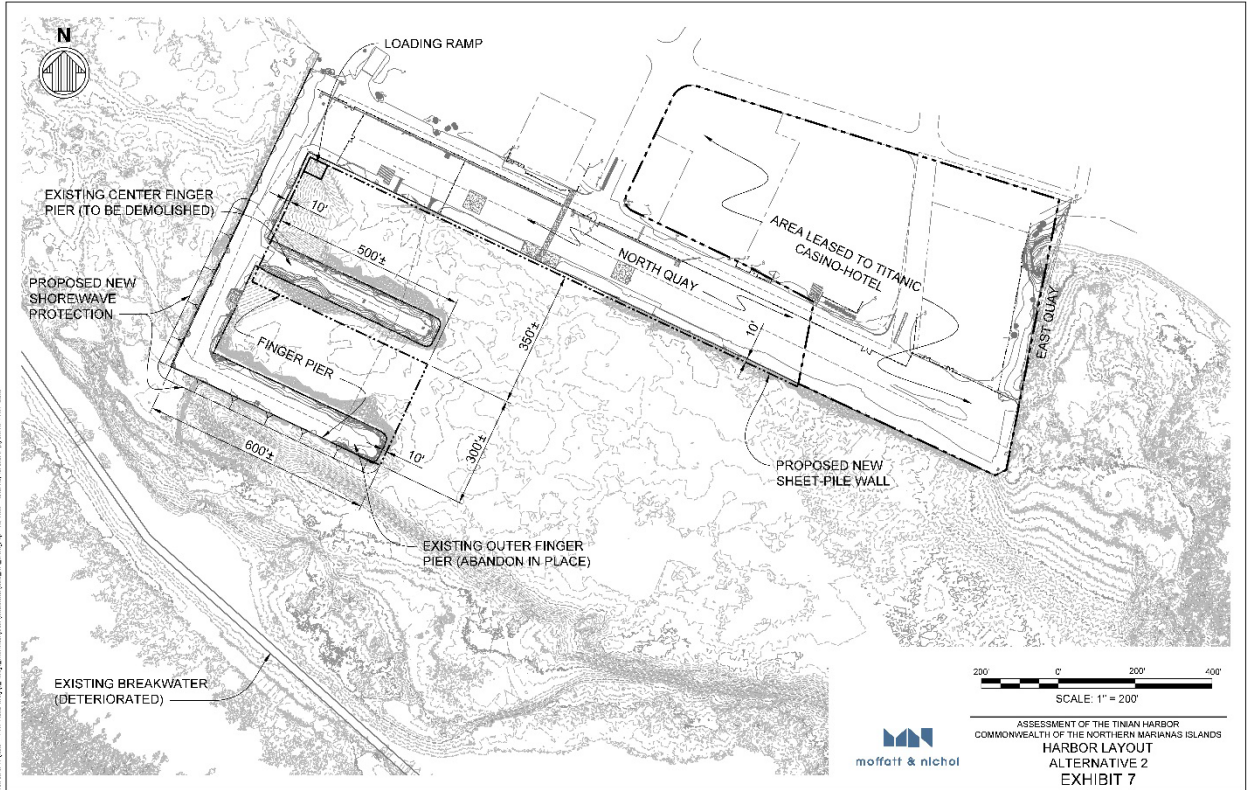


Figure E-3 – Harbor Layout Alternative 2

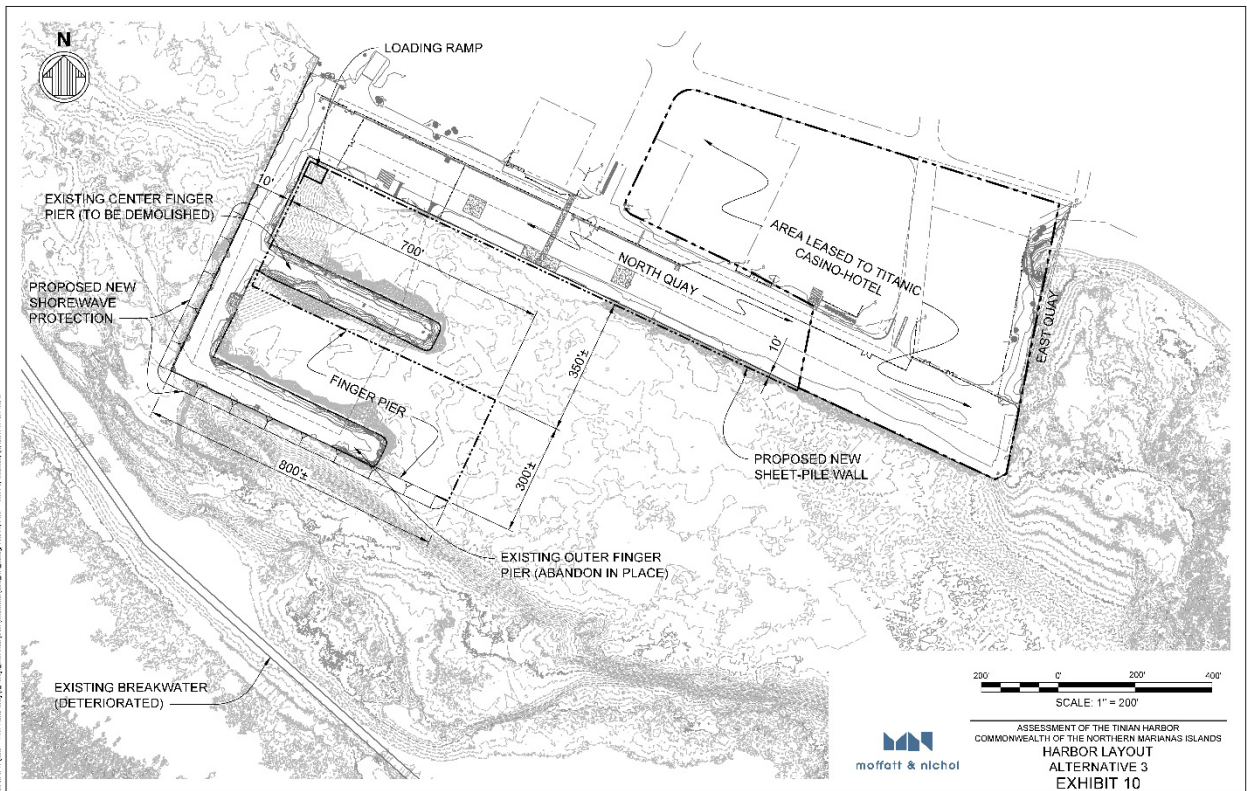


Figure E-4 – Harbor Layout Alternative 3

The following table compares the advantages and disadvantages for each.

#	Alternative Description	Advantages	Disadvantages
1	Filling-in the basin between Center Finger Pier and Outer Finger Pier resulting in a 500-ft long by 425-ft wide pier with a total of 925 linear feet of berthing face	<ol style="list-style-type: none"> <li>1. Provide a 425-ft wide pier-backland space</li> <li>2. Requires the least dredging volume of the three alternatives</li> <li>3. End of pier can berth up to 320 feet long vessels</li> <li>4. Least cost of the three alternatives</li> </ol>	<ol style="list-style-type: none"> <li>1. Narrow (225-ft wide) basin between the new Finger Pier and the North Quay. This narrow basin limits size and number of vessels that can berth in this basin</li> <li>2. Not adequate for berthing vessel longer than 440 feet along the north face of the new Finger Pier</li> <li>3. Back land space may be too wide for the expected use.</li> </ol>
2	Widening the existing Outer Finger Pier to 300 feet and demolishing the existing Center Finger Pier resulting in a 500-ft long by 300-ft wide pier with a total of 800 linear feet of berthing face	<ol style="list-style-type: none"> <li>1. Provides a wide (350 feet) basin between the new Finger Pier and the North Quay. This wide basin will provide flexibility that allows a wide range and maximum number of vessels to be berthed and travel in this basin</li> <li>2. Adequate pier-backland space (300 feet wide) for expected operations</li> <li>3. Use of material from existing Center Finger Pier as backfill</li> </ol>	<ol style="list-style-type: none"> <li>1. Require demolition and dredging of existing Center Finger Pier</li> <li>2. Not adequate for berthing vessel longer than 440 feet along the north face of the finger pier</li> <li>3. End of finger pier can berth up to 200+ feet long vessels</li> <li>4. Additional cost compared with Alternative 1</li> </ol>

#	Alternative Description	Advantages	Disadvantages
3	Widening the existing Outer Finger Pier to 300 feet, extending the pier to 700 feet long and demolishing the existing Center Finger Pier resulting in a 700-ft long by 300-ft wide pier with a total of 1000 linear feet of berthing face	<ol style="list-style-type: none"> <li>1. Provides a wide (350 feet) between the new Finger Pier and the North Quay. This wide basin will provide flexibility that allows a wide range and maximum number of vessels to be berthed and travel in this basin</li> <li>2. Adequate for berthing vessel longer than 550 feet along the north face of the pier</li> <li>3. Adequate pier-backland space (300 feet wide) for expected operations</li> <li>4. Use of material from existing Center Finger Pier as backfill</li> </ol>	<ol style="list-style-type: none"> <li>1. Require demolition and dredging of existing Center Finger Pier</li> <li>2. End of pier can only berth up to 200+ feet long vessels</li> <li>3. Additional cost compared to Alternatives 1 and 2</li> </ol>

Each alternative includes an unloading ramp provided at the junction between the North Quay and the Connecting Pier.

This study does not recommend implementation of Alternative 1 due to the limited use of the narrow basin between the new Finger Pier and the North Quay. As presented in the report, Alternative 3 is approximately 4% higher cost than Alternative 2. This study identify Alternative 3 as the most desirable. Since Alternative 3 offers the greatest operational flexibility over the other alternatives, this study recommend Alternative 3 be further developed. .

**ENTITLEMENT/ENVIRONMENTAL PROCESS AND PERMITTING**

The entitlement process will need to consider the environmentally sensitive coastlines and resources of Tinian. These include the potential for corals, Endangered Species Act (ESA)-protected species, marine protected near shore areas, and marine cultural and historic resources. The process will consider short term construction related impacts as well as long term impacts as a result of the modernized facility, including increased harbor activity. A federal categorical exemption (CATEX) or Environmental Assessment (EA) will, at a minimum, be required for this project. Given the scope of the proposed project, an Environmental Impact Statement (EIS) may also be likely, which would compare selected project alternatives and consider cumulative impacts on the physical environment, biological environment and human environment. This process will result in the selection of a preferred alternative. In addition, the following permits and consultations are anticipated before construction can begin:

1. USACE Rivers and Harbor Act Section 10 regulates the placement of structures in “navigable waters”.
2. Clean Water Act (CWA) regulates virtually all physical alterations and discharges into “waters of the U.S.”, including Section 401 Water Quality Certification (WQC), Section 402 National Pollution Discharge Elimination System (NPDES), and Section 404 of the CWA specifically regulates the discharge of fill materials into “waters of the US”.



3. Section 106 of the National Historic Preservation Act (NHPA) requires that federally assisted or permitted projects account for the potential effects on sites, districts, buildings, structures, or objects that are included in or eligible for inclusion in the National Register of Historic Places.
4. The Endangered Species Act (ESA) has the purpose to conserve “the ecosystems upon which endangered and threatened species depend” and to conserve and recover species listed as Endangered or Threatened.
5. The Marine Mammal Protection Act (MMPA) of 1972 prohibits the take or harassment of any marine mammals (not just protected species).
6. Under the Coastal Zone Management Act (CZMA), any federal agency conducting or supporting activities directly affecting the coastal zone must demonstrate the activity is, and will proceed in a manner, consistent with approved State’s/Commonwealth’s Coastal Zone Management Program.
7. The Bureau of Environmental and Coastal Quality (BECQ) is an agency under the Governor that was established by the Commonwealth Protection Act to “develop and administer programs... 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.” Regulations include Water Quality Standards Regulations, Earth Moving and Erosion Control Regulations, and Individual Wastewater Disposal System (IWDS) Rules and Regulations.

**PROJECT PHASES AND SCHEDULE**

The overall harbor improvement project is expected to be constructed in a minimum of two (2) distinct phases, as schematically illustrated on Figure E-5.

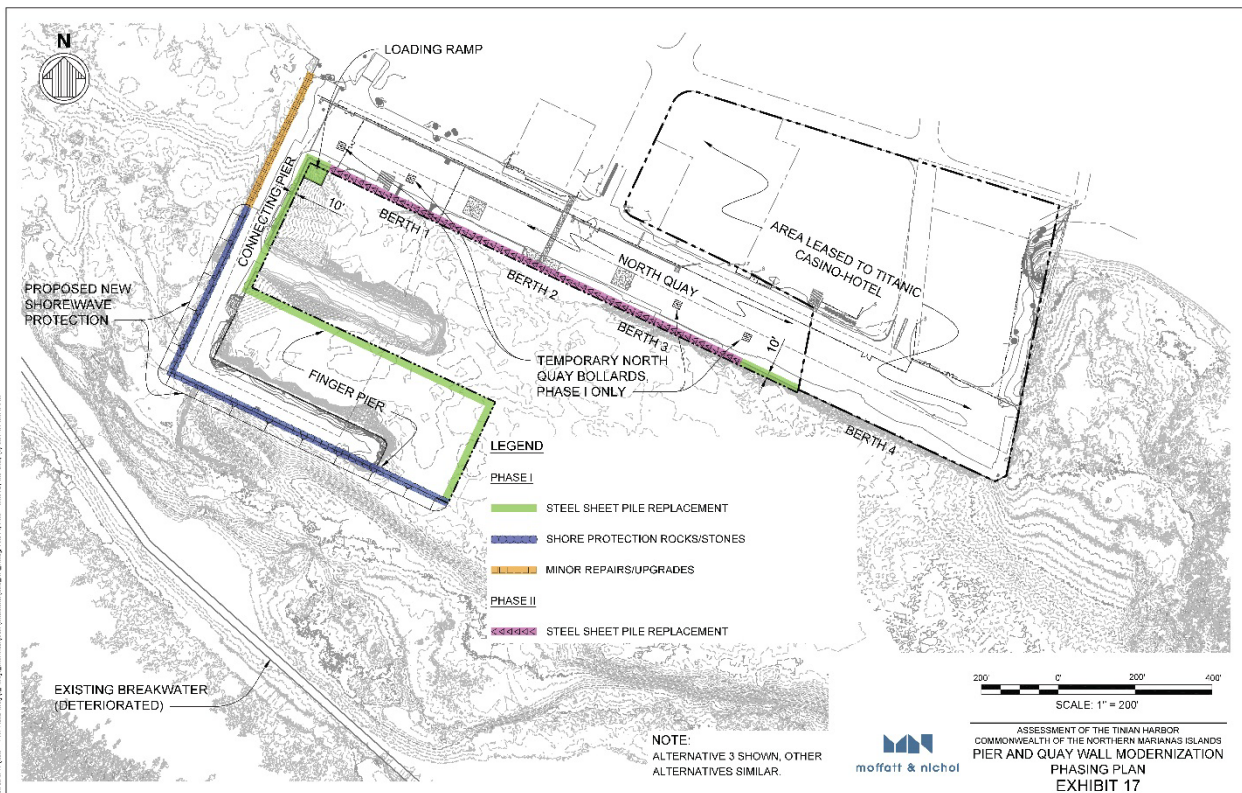


Figure E-5 – Pier and Quay Wall Modernization Plan

Phase 1 generally represents the modernization of the Connecting Pier, the Finger Piers and the west end of Berth 4 in the North quay outside of the leased area, deemed necessary in the short term given the critical conditions of those structures. Phase 1 would also include the dredging of the harbor, and installation of a sacrificial corrosion protection system on North Quay Berths 1 to 3 to extend their service lives until such time that they are replaced under a future phase of work.

Phase 2 represents the modernization of the North Quay berths (1 to 3), and is considered to be deferred maintenance and upgrade based on the usable condition of the current structure.

Drainage, fire protection, potable water service, and lighting improvements will be installed during each phase as they are associated with the major improvements.

The anticipated schedule to complete the harbor modernization project, assuming independent procurement and mobilization for each of the two phases, is approximately 4 1/2 years for Phase 1, including solicitation of environmental and design consultant, entitlement/environmental, design and construction document development, bid, award and construction; and 3 1/4 years for Phase 2 – assuming that the entitlement work during Phase 1 encompasses the overall harbor improvement project.

#### **OPINION OF PROBABLE COSTS**

The Opinion of Probable Construction and Project Cost (OPCC) for Phase 1 ranges from approximately \$75M to \$85M for Alternatives 1 to 3, respectively. The OPCC for Phase 2 is the same for each alternative, and is estimate to be \$32M. The costs include typical markups for Contractor Overhead and Profit, Mobilization, Environmental Mitigation, Permitting, Entitlement work, Design, Construction Management and the Owner's cost to manage and execute the project. The costs are in early 2015 dollars and have not been adjusted for inflation to account for implementation in the future.

The program cost for the recommended Alternative 3 is summarized as follows:

- Phase 1 \$85,000,000
- Phase 2 \$32,000,000
- Total \$117,000,000

## 1.0 Introduction

### 1.1. Background

The island of Tinian is located approximately 80 miles north of Guam, and 5 miles south of Saipan, with a land area of approximately 39 square miles. Tinian Harbor is located on the southwest side of the island (see Figure 2-1) in the village of San Jose and serves as the principal point of entry for goods and passengers to the island. Its ability to handle different forms of commercial and private vessels is essential to the people of Tinian and its economy.

U.S. Navy Seabees constructed the permanent harbor facilities in Tinian to accommodate the berthing of up to eight Liberty class vessels near the end of World War II (WW II). Dredging of the harbor was performed between September 1944 and January 1945 with dredge depths shown on historical exhibits between 28 to 32 feet below MLLW. A US Army Corps of Engineers (USACE) report dated 1981 stated that the dredge depths for original construction varied between -28 and -30 feet. Although this is an apparent inconsistency this will have no bearing on the proposed project alternatives. The harbor facilities consists of a breakwater, approximately 4,800 feet in length together with 1,210 linear feet of interlocking sheet piles that extends from the breakwater to shore. In addition to the breakwater, the harbor also consists of two 80-ft wide by 500-ft long sheet-pile finger piers, an approximately 2000-ft long cargo ship sheet-pile bulkhead quay wall and an 88-ft wide pier connecting the quay wall to the finger piers. The breakwater, quay walls, finger piers and connecting pier were completed in March 1945. Figure 1-1 provides a photo of the harbor during WWII, and a recent photo.



Figure 1-1: Tinian Harbor. Aerial view of Tinian Harbor taken during World War II in 1945, the first year of operation and in recent year.

The 1997 Tinian Harbor Master Plan (prepared for CPA, CNMI) indicated that the quay wall, finger piers and connecting pier are badly deteriorated. A more recent study conducted in November 2009 discovered that all components of the harbor are severely deteriorated, with a cost estimate of \$39 million for repairs. According to the 2009 study, the outer breakwater sheet piling and circular cells are badly deteriorated and a majority of the sheet piles have collapsed and are no longer effective. Sections of the inner harbor finger pier sheet piles are also severely deteriorated and the piers appear to be on the verge of collapse; therefore, the piers are

currently condemned and not usable. Lastly, silt and debris have accumulated along the north quay limiting access, and therefore, maintenance dredging is required to restore original design operational dredge depth.

The Tinian Harbor facilities, which include the breakwater, piers and quay wall are severely deteriorated due to age. Major rehabilitation work is necessary to allow continued usage of the waterfront facilities and strengthening of the facilities will be required to expand/upgrade the facilities to support the future growth of Tinian. This report is to cover the assessment of the piers and quay wall of the inner harbor. A separate study is being done by others to assess the breakwater.

M&N has been engaged to assess the conditions and rehabilitation/upgrade of the piers and quay wall in Tinian Inner Harbor and provide recommendation for rehabilitation and upgrades.

## **1.2. Purpose and Objective**

### **1.2.1. Purpose**

Executive Summary of the 1997 Tinian Harbor Master Plan stated:

“Tinian's deep water port is more than 50 years old and the breakwater and piers are badly deteriorated. The deep water port is a fine asset to both Tinian and the CNMI, but if the harbor is to remain useful on a daily basis, significant expenses are required to rehabilitate the breakwater and piers. If major rehabilitation is not undertaken, the harbor will be operational less frequently, and with less predictability. If the port could not be relied upon by shippers, there would be little likelihood of economic growth which had any dependency on shipping and to a large extent this would include shipment of construction materials.”

The 1997 Tinian Master Plan also stated the following Vision for Tinian:

“This is a resort, recreation and general purpose port. It is not an industrial port. As such, it has more than enough capacity for general and containerized cargo to serve a residential and resort community to at least the year 2015 and a population of 60 to 70 thousand (based on very high estimates of population growth).

Because the surrounding land and the pier and harbor areas are not large areas, the port does not have large land areas or well suited sites for industrial activities (such as major ship repairs or fish canneries). Also, because the planning objective for Tinian Port is part of the visitor destination growth strategy for the island, heavy industrial land uses are better left to Saipan or other locations.

To achieve this vision, the port must be kept neat, clean and well-landscaped because of the numerous visitors who will pass through it. This implies a special responsibility with strong a commitment to making Tinian Harbor and port lands a beautiful and attractive place to visit. Because of its proximity to the House of Taga, the port has a special responsibility to assist in the protection, restoration and enhancement of this prehistoric site --one of the most important in the Mariana Islands. The port is also noteworthy because of its vital role in the atomic age during the end of World War II.

The port is intended to serve mostly cargo feeder vessels originating in Saipan where that port has a large-vessel capacity and a greater landside area for container handling. However Tinian Harbor has sufficient berths, docks, depth and turning basin capacity to handle very large, though not especially

deep draft, vessels. However, vessels greater than 450 to 500 feet in length may need tug assist. The port can accommodate the occasional passenger vessel, large freighter, or military vessel when necessary.”

Over 15 years later in 2014, the above stated 1997 conditions and vision for Tinian Harbor remain unchanged with the following updates based on information provided during the October 28, 2014 stakeholder meeting:

- The stakeholders agreed that an updated Harbor Master Plan would be a useful tool in defining the future operational requirements at the facility.
- Vessel usage information are available in the 1997 Tinian Harbor Master Plan, and applicability of the information in the Master Plan shall be confirmed by Commonwealth Ports Authority (CPA).
- In addition to the fuel and cargo vessels that currently call on the port, the stakeholders identified the following list of potential vessels that may visit Tinian Harbor:
  - Passenger ferry vessel from Saipan (past service terminated recently). The berth will need to accommodate a lay down ramp.
  - Joint High Speed Vessel (JHSV).
  - Tourist cruise vessels have visited Tinian in the past and may continue to do so in the future.
- MARFORPAC noted that DOD vessels larger than the JHSV are expected to be anchored outside of the breakwater. Personnel from large DOD vessels will be ferry to shore using Amphibious Assault Vehicles (AAV) or other small crafts.

The purpose of this assessment study is to determine the conditions of the existing piers and quay wall and to develop alternatives on what need to be done to these facilities to improve their conditions and the associated rough order of magnitude costs in order meet the vision and needs described above.

### **1.2.2. Objective**

The objective of this assessment study is to develop the necessary scope of improvements to the existing Tinian Inner Harbor facilities (piers and quays) to meet the anticipated future uses of the facility, and to provide a road map on the implementation of the recommended improvements.

## 2.0 Site Conditions and Constraints

Tinian Harbor is located on the southwestern side of the village of San Jose, Tinian, CNMI as shown on Figure 2-1.



Figure 2-1: Tinian Harbor Location Map

## 2.1. Site Conditions

The harbor consists of a basin formed between the mainland and an offshore reef on which a breakwater was constructed (see Figure 2-2). The harbor has a length of over one-half mile and a width of one-eighth to nearly one-fourth mile. Shores adjoining the harbor are cliffs and rocky slopes and, in some places, the shoreline is bordered by reefs. San Jose Village is located a short distance northeast of the harbor. Majority portion of Berth 4 in the North Quay and East Quay (collectively called East Quay by CPA) has been leased to developer to construct the Titanic Casino-Hotel complex.

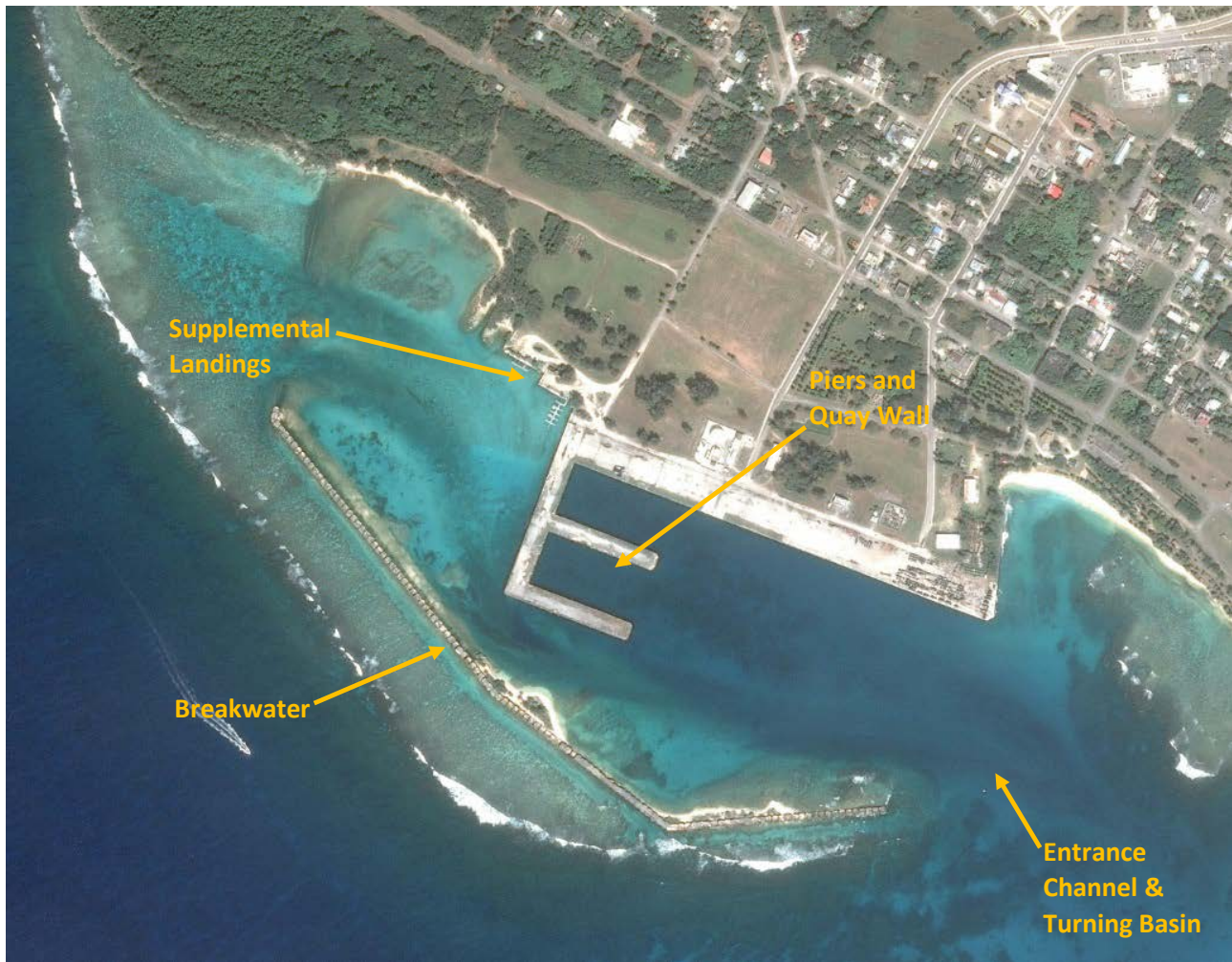


Figure 2-2: Tinian Harbor Aerial View

### 2.1.1. Entrance Channel and Turning Basin

Tinian Harbor can be approached from any direction in deep water. An entrance channel leads northward through a break in the fringing reef and into the harbor. The entrance channel has a length of one-half mile, a least width of 525 feet and a least depth of 30 feet. The berthing areas and harbor turning basin, the latter about 700 feet in diameter, have been dredged to depths of 28 to 30 feet. Little if any shoaling has occurred in the harbor since 1945. It is possible that shoaling may be more pronounced in the entrance channel. Local stakeholders noted that marine currents pass through the dilapidated breakwater (creating an opening) north-

west of the harbor resulting in sandy deposits along the inside face of the breakwater near the southwest corner of the Outer Finger and within the turning basin just east of the piers and quay wall. The deposits create a narrowing of the channel in the area between the breakwater and the Outer Finger. This channel is used by small craft heading to and from the marina and ramp west of the connecting pier. No dredging has been undertaken since World War II.

### **2.1.2. Breakwater**

In order to protect the harbor, a breakwater was constructed on the northern part of the barrier reef. The breakwater consists of interlocking steel sheet piling in circular cell configuration. The interior of the cells is filled with quarried limestone (coral fill) and blanketed with a layer of gravel and overlaid with unreinforced concrete slab. The height of the breakwater is approximately 15 feet above MLLW and its length is approximately 3,600 feet. An additional 1,210 feet of single row sheet piling extends from the shore to the northwest of the circular cell breakwater.

The single row sheet pile wall is almost completely deteriorated. The circular cells have lost their fill and many cells are almost completely washed out. Consequently, the harbor facilities would be subjected to direct wave attack.

Assessment together with development of future plan of the breakwater are being performed by others and are not going to be addressed in this report.

### **2.1.3. Piers and Quay Walls**

Tinian Inner Harbor had a total of some 4,400 linear feet of berth face that was suitable for the transfer of general cargo. Figure 2-3 shows the Seabee's Waterfront Installation plan prepared in 1945. The existing harbor layout based on recent survey is shown on Appendix A, Exhibit 2. The North Quay, inside the harbor and parallel to the waterfront is about 2,000 feet long and 250 feet wide. A Connecting Pier 600 feet long and 88 feet wide projects at a right angle from the northwest end of the North Quay. Two 500-foot long by 80-foot wide Finger Piers, parallel to the north quay, extend southeast from the 600-foot connecting pier. The piers and quay wall are constructed of steel sheet piling, filled with compacted coral and covered with asphaltic concrete. The 1997 Tinian Harbor Master Plan stated that "it has more than enough capacity for general and containerized cargo to serve a residential and resort community to at least ..... a population of 60 to 70 thousands." This estimate was conditioned upon the wharves being in usable condition. The pier and quay steel sheet piling (SSP) has been deteriorating since the original construction in 1945. Since 1979, several repairs have been made to incorporate concrete elements at the top portion of the SSP to protect and extend the life of SSP walls (See Figure 3-1 in Section 3). Current conditions of the piers and quay walls are discussed in Section 3 of this report.





Figure 2-3: Existing Harbor Layout (Courtesy of Seabee Museum)

### 2.1.4. Supplemental Landings

The basin enclosed by the northwestern part of the breakwater and the west wall of the Connecting Pier is a boat harbor with depths of 5 to 8 feet. Small craft can berth along the connecting pier wall. A small craft marina facility consists of floating docks is located west of the connecting pier. West of the marina is a boat landing ramp. Assessment of the marina and boat ramp is not part of this study.

## 2.2. Geotechnical Conditions

The in-situ geotechnical conditions were characterized through a combination of reviewing historic geotechnical boring data and carrying out a current geotechnical boring program.

1. "Repair of Tinian Harbor Facilities", prepared by Gillham, Koebig & Koebig, Inc., dated January 1980. As-built plans include Sheet Nos. C-2 and C-3 describing 2 geotechnical boring logs B3 on the west quay wall near Finger Pier "A", and B4 near the intersection between the north and east quay walls.
2. Three additional geotechnical borings by Geotesting, Inc., dated November 2014. A geotechnical report is provided in Appendix C.

In general, the results from the current boring program compare well with the historic boring data. The fill materials behind the bulkheads generally consist of approximately 10 feet of firm and cohesion less sand / gravel, with no silt or clay. Native fill materials extend approximately 15 to 20 feet below this layer, and they are also gravelly and sandy, generally dense, except for a few thin pockets of loose sand. The fill materials are not expected to liquefy during a seismic event.

Hard limestone bedrock generally starts approximately 25 to 30 feet below the existing ground surface.

### 2.3. Topographic Survey

The topographic survey was conducted in August, 2014 by Meridian Land Surveying using local benchmarks and USGS datum. The coordinates were based on the Mariana Island District coordinate system of 1966. The vertical datum was based on Mean Sea Level from TAM-19. This survey was adjusted to be integrated into the Hydrographic survey (described below) which shifted vertical elevations by +1.11 feet. In addition, the horizontal coordinates were translated to be consistent with the hydrographic survey to WGS84 UTM zone 55N, feet.

The topographic survey covers the wharf area and local entrance roads to the site. The survey includes local benchmarks, tops of the bulkhead wall, and surface features. A copy of the survey map is provided in Appendix A.

### 2.4. Hydrographic Survey

Bathymetric Lidar Data was collected on April 14 to 17, 2013 by Fugro under contract to Tetra Tech. AECOM processed the point data (provided by Fugro) in October 2013 to generate a 1-meter Digital Engineering Model (DEM) and from that a 1-foot contour (bathy) file and a xyz point topo / bathy file (meter). CNMI/CIP provided these data to M&N. These data were referenced to the vertical datum WGS84 (ellipsoidal height), meters. Data accuracy is presented below as described in the associated metadata file:

- The minimum horizontal accuracy of the data is 5 m + 5% of depth
- The minimum vertical accuracy of the data is approximately 0.5 m (20 in), or more precisely  $\pm (0.5^2 + (d * 0.13)^2)^{0.5}$ , where d is the water depth

The Lidar elevation data was first converted from WGS84 vertical datum to MLLW by comparing known benchmark points with Lidar points resulting in a conversion factor of 2.11 feet. This converted file was also compared to an earlier NOAA hydrographic survey dated May 2007 and found to be in general agreement except in areas near-shore, where anecdotal information of shoaling would explain the difference.

### 2.5. Coastal Environmental

A summary of the metocean conditions is provided in this section.

#### 2.5.1. Tides and Tidal Datums

The closest NOAA tide gauge to the Project Site is located at Apra Harbor, Guam approximately 120 miles to the south-east of Tinian Harbor. Water level datums from Apra Harbor are provided in Table 2-1.

*Table 2-1: Tidal Datum for NOAA Tide Station at Apra Harbor, Guam*

Tidal Datum	Abbreviation	Elevation (feet MLLW)
Highest Observed Water Level	Maximum	4.29
Highest Astronomical Tide	HAT	2.71
Mean Higher-High Water	MHHW	2.34
Mean High Water	MHW	2.22

Tidal Datum	Abbreviation	Elevation (feet MLLW)
Mean Tide Level	MTL	1.41
Mean Sea Level	MSL	1.37
Mean Low Water	MLW	0.60
Mean Lower-Low Water	MLLW	0.00
Lowest Astronomical Tide	LAT	-1.17
Lowest Observed Water Level	Minimum	-2.34

### 2.5.2. Non-Tidal Residuals

Non-tidal residuals (also known generally as surge or metrological water level) can result from storm surges, reduced atmospheric pressure, wave setup, and large scale climate patterns. Non-tidal residuals were identified based upon an analysis of the Apra Harbor tide gauge record. In total, 146 known tidal frequencies were regressed onto a 19 year truncated time series to determine the astronomical amplitudes and phases. From these constituents, a time series lasting the total record length was constructed and used to isolate deviations from the astronomical water level.

An extreme value analysis was performed on the time series to determine return interval statistics; results are summarized in Table 2-2 and shown on Figure 2-4. The data indicate the 50- and 100-year surge events are 1.6 feet and 2.0 feet, respectively.

*Table 2-2: Non-Tidal Residual Return Periods for Apra Harbor, Guam*

Return Period (years)	Non-Tidal Residual (feet)
2	0.8
5	1.0
10	1.1
25	1.4
50	1.6
100	2.0

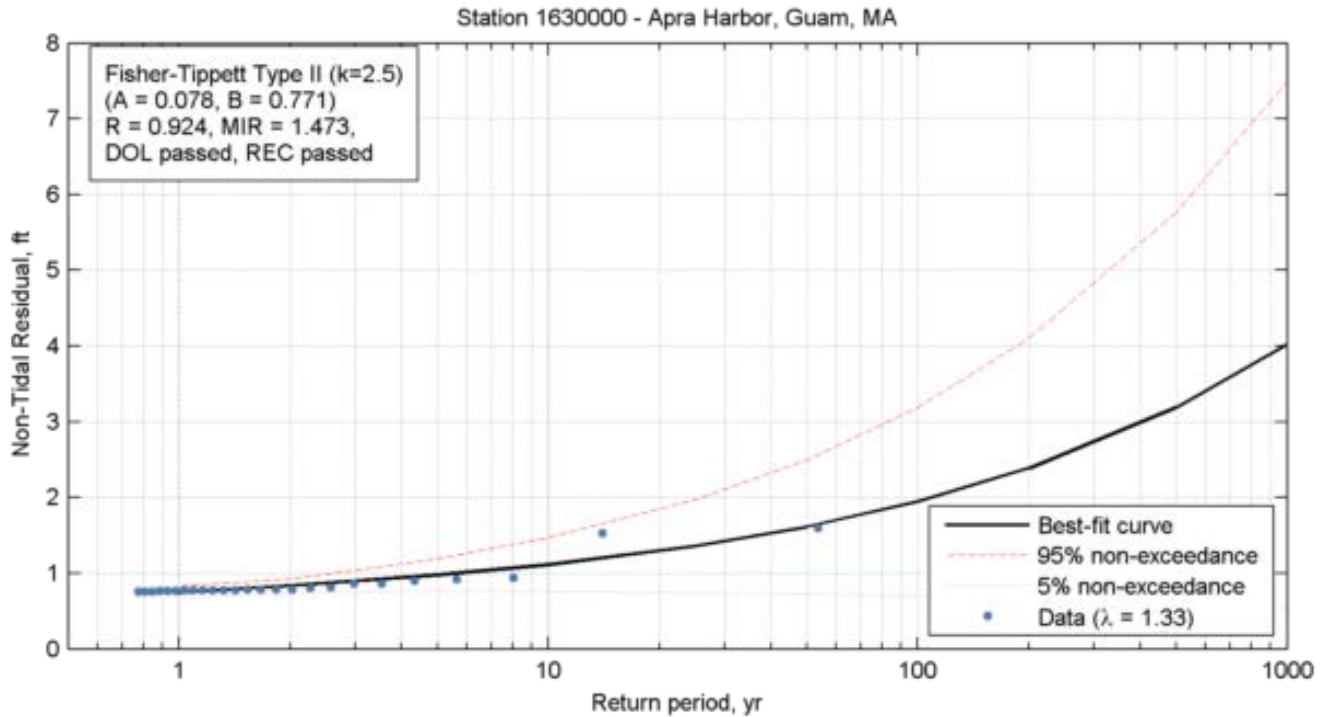


Figure 2-4: Non-Tidal Extreme Value Curve for Apra Harbor, Guam

### 2.5.3. Sea Level Rise

Global sea-level rise (SLR) is the result of the melting of land-based ice and the expansion of the water column as ocean water warms. Based on measurements at Apra Harbor, Guam, the mean sea level in the study area has decreased at an average rate of  $-0.00344$  ft/yr (USACE 2014).

SLR is projected over the next century under a wide range of scenarios; the range of the projections is due to uncertainty associated with global temperature models derived from the Intergovernmental Panel on Climate Change (IPCC). Based on this uncertainty, SLR estimates are typically separated into low, medium, and high values based on a variety of assumptions. Of particular importance is that the uncertainty in the projections increases with time, with most models in general agreement with one another until approximately mid-century (2050). For long-term planning, it is important to consider a range of potential SLR scenarios, which will be completed during the design phase of the project.

Figure 2-5 (USACE 2014) provides a visual of three SLR projections representing low, medium, and high conditions. *USACE Int* represents the intermediate-end projection, which demonstrates a rise in relative sea level of approximately 0.25 feet by the year 2065.

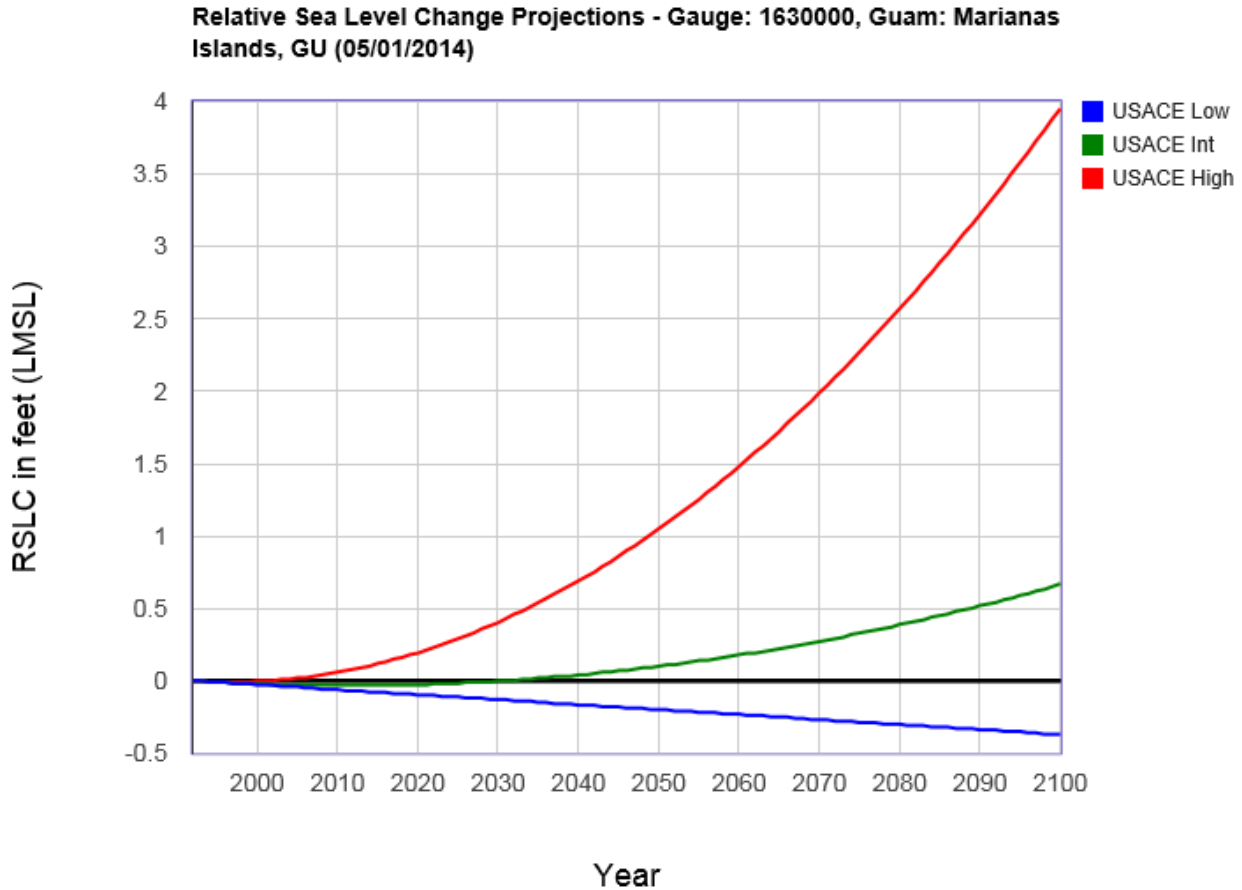


Figure 2-5: Projected Sea Level Rise for the Next Century Relative to 1992 (USACE 2014)

## 2.5.4. Waves

### 2.5.4.1. Offshore Wave Conditions

The Wave Information Studies (WIS) project developed by the USACE produces an online database of estimated nearshore wave conditions covering U.S. coasts (USACE 2011). The wave information is derived based on a database of collected wind measurements and is calibrated by offshore wave buoys. The hindcast data provide a valuable source of decades-long (1980 – 2011) wave information needed in coastal engineering design; however, it is representative of offshore conditions only. Wave data was analyzed from WIS station 81104 located at 15.000 N 145.000 E, approximately 75 miles to the south-west of Tinian.

The joint histogram is shown in Figure 2-6 in terms of significant wave height and peak wave period.

- The *significant wave height* is defined traditionally as the average wave height (trough to crest) of the highest third of the waves.
- The *peak wave period* is defined as the wave period associated with the most energetic waves in the ocean at a specific point.

Only waves coming from between 135-315 degrees North were included in the analysis to account for the sheltering effect of the Island of Tinian.

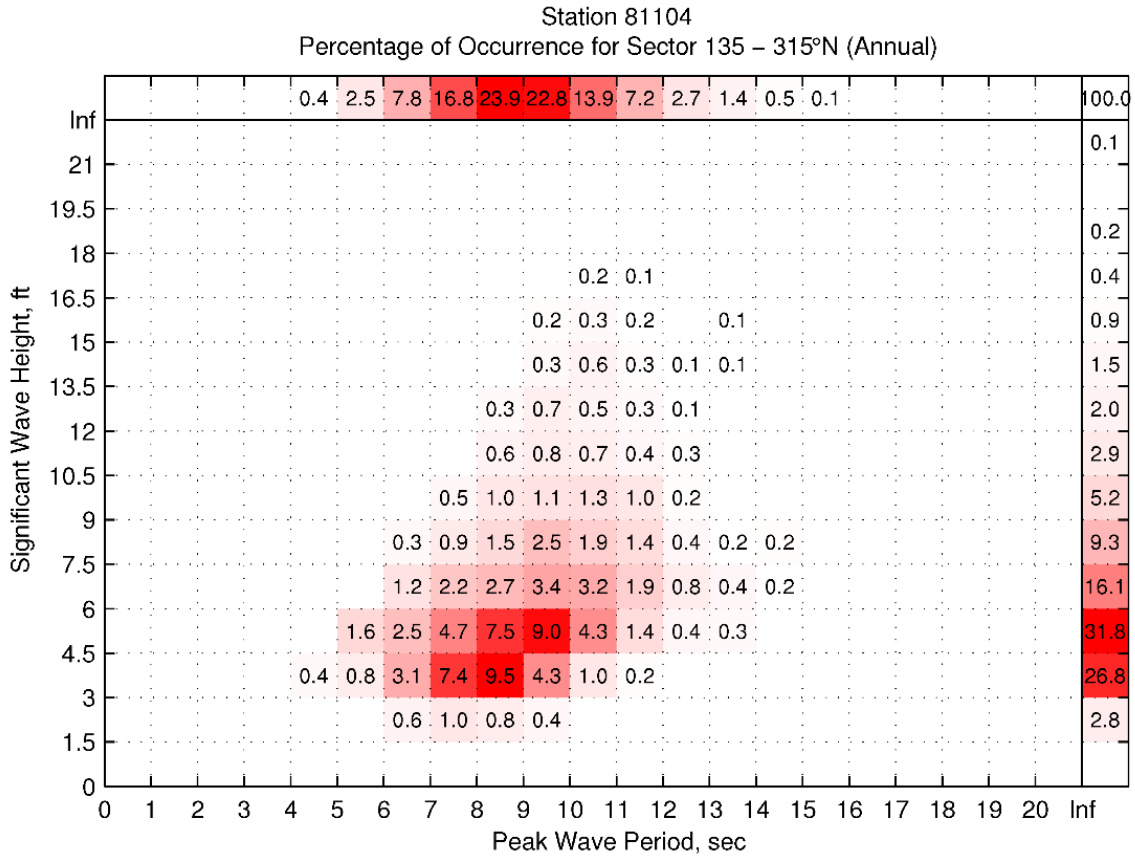


Figure 2-6: Significant Wave Height vs. Peak Wave Period for WIS Station

In order to evaluate the probability of occurrence of extreme wave events, a peak-over-threshold analysis was performed to isolate extreme events and determine return periods. Numerous probability density functions (Fisher-Tippett Type I, Fisher-Tippett Type II, and Weibull) were tested to determine the probability density function that provides the best fit. Return interval statistics are adjusted for record length and sample interval. A selection was made based on the probability density function with the highest correlation.

Extreme value analysis results are summarized in Table 2-3 and shown on Figure 2-7. The data indicate the 50- and 100-year significant wave heights are 30.3 feet and 33.1 feet, respectively.

Table 2-3: Extreme Significant Wave Height Analysis Values.

Return Period (years)	Significant Wave Height (feet)
2	17.2
5	20.9
10	23.7
25	27.5
50	30.3
100	33.1

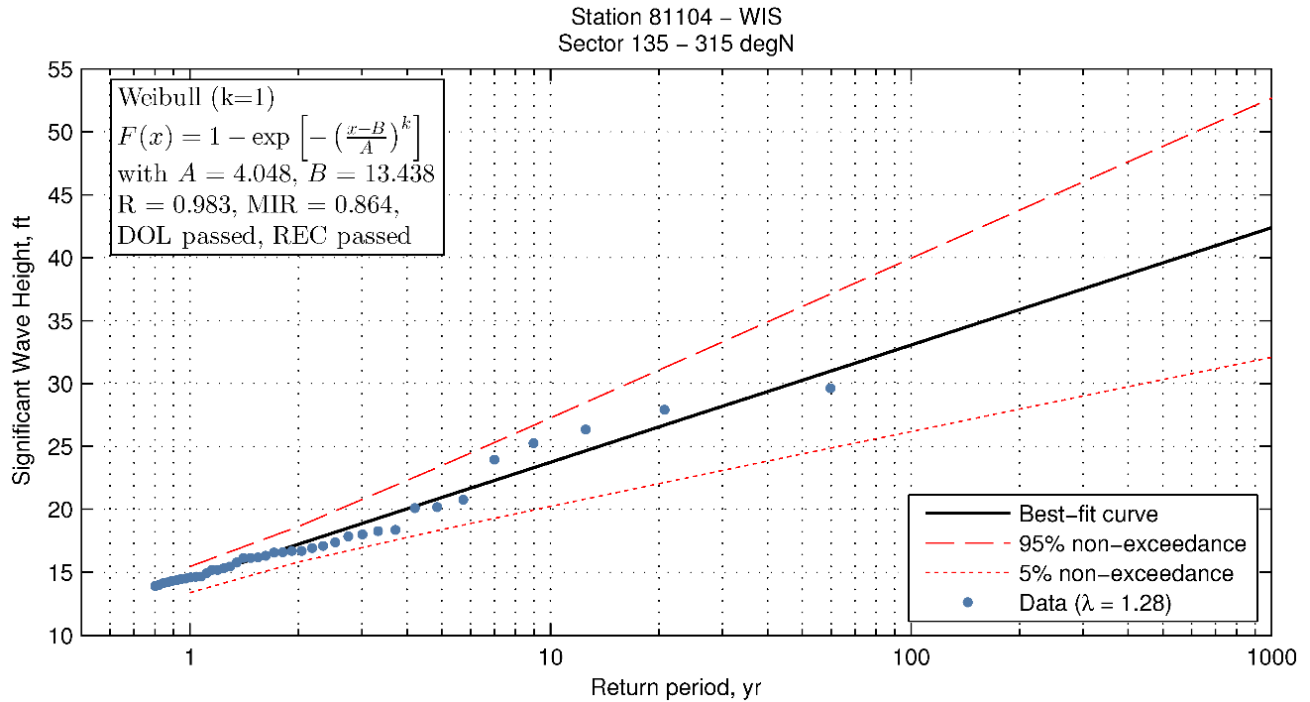


Figure 2-7: Extreme Significant Wave Height Analysis from WIS Wave Data.

**2.5.4.2. Nearshore Wave Modeling**

The wave modelling is based on the current conditions of the breakwater. Wave agitation within Tinian Harbor is primarily a result of offshore waves penetrating through the entrance channel. Wave propagation into Tinian Harbor was modeled using a Boussinesq Wave (BW) model developed by the Danish Hydraulic Institute (DHI). The major benefit of the BW model is that it can handle wave diffraction and reflection/transmission by the coastal structures commonly encountered in a harbor layout.

Waves were transformed from the offshore WIS station to the model boundary (-82 ft MLLW) using linear shoaling and refraction. The domain was then broken down into 15 sectors and considered waves coming from between 165 and 305 degrees. Using the same approach as the offshore wave conditions, an extreme value analysis wave carried out for each direction. The result is a set of significant wave height extreme values based upon direction (summarized in Table 2-4).

Table 2-4: Directionally Depended Extreme Significant Wave Height Analysis Values at -82 ft (-25 m) MLLW Contour

Return Period (years)	Sector (degrees from North)														
	165	175	185	195	205	215	225	235	245	255	265	275	285	295	305
	Significant Wave Height (feet)														
2	4.4	5.9	7.7	9.5	10.5	11.1	11.5	12.1	12.5	12.3	11.4	9.5	9.1	7.9	5.5
5	5.4	6.8	8.6	11.4	12.5	13.3	13.5	14.4	15.2	15.2	13.6	11.6	11.5	9.7	7.5
10	6.1	7.3	9.2	12.6	14.0	14.8	14.9	16.0	17.3	17.3	15.1	13.0	13.0	10.7	8.9
25	6.8	8.0	9.8	14.1	16.1	16.5	16.5	18.3	20.6	20.2	16.8	14.7	15.0	11.9	10.9
50	7.3	8.4	10.2	15.2	17.9	17.8	17.7	20.2	23.5	22.4	18.1	15.8	16.3	12.7	12.3
100	7.7	8.7	10.6	16.2	19.7	19.0	18.8	22.2	26.8	24.6	19.3	16.9	17.6	13.4	13.8

Waves were transformed to Tinian Harbor using the agitation coefficients from the BW model. A unit wave height (significant wave height = 3.28 ft [1 m]) with a representative period of 13 seconds was used for the wave agitation modeling inside the harbor. Agitation coefficients were extracted from various points within Tinian Harbor. The points are shown in Figure 2-8 and values summarized in Table 2-5.



Figure 2-8: Selected Locations for Wave Agitation Coefficients



Table 2-5: Agitation Coefficients for Tinian Harbor

Location	Sector (degrees from North)														
	165	175	185	195	205	215	225	235	245	255	265	275	285	295	305
	Agitation Coefficient (-)														
1	0.55	0.64	0.43	0.33	0.45	0.45	0.34	0.26	0.20	0.17	0.13	0.11	0.08	0.06	0.05
2	0.52	0.59	0.46	0.39	0.42	0.40	0.30	0.26	0.25	0.21	0.18	0.15	0.11	0.07	0.06
3	0.59	0.66	0.59	0.41	0.48	0.49	0.36	0.28	0.29	0.23	0.19	0.17	0.12	0.09	0.08
4	0.42	0.49	0.43	0.36	0.35	0.31	0.25	0.19	0.18	0.16	0.13	0.12	0.08	0.05	0.05
5	0.74	0.87	0.81	0.42	0.31	0.53	0.47	0.27	0.20	0.20	0.16	0.13	0.10	0.07	0.07
6	0.03	0.04	0.03	0.02	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
7	1.10	1.46	1.44	1.01	0.66	0.78	0.74	0.50	0.36	0.27	0.23	0.20	0.15	0.11	0.10

Using the extreme value analysis results from Table 2-4 and agitation coefficients from Table 2-5, significant wave heights were approximated at each point by taking a weighted average of significant wave heights for all directions based upon the percent of occurrence for each direction. A complete summary of the approach and results can be found in Appendix D.

Extreme value analysis results are summarized in Table 2-6. The data indicate the maximum omnidirectional for 50- and 100-year return period significant wave heights are 6.8 feet and 7.2 feet, respectively.

Table 2-6: Omni-Directional Extreme Significant Wave Height by Location for Tinian Harbor

Return Period (years)	Location							Maximum
	1	2	3	4	5	6	7	
	Omnidirectional Significant Wave Height (feet)							
2	1.7	1.9	2.2	1.6	2.6	0.1	4.6	4.6
5	2.0	2.2	2.6	1.9	3.1	0.1	5.4	5.4
10	2.2	2.4	2.9	2.1	3.3	0.1	5.8	5.8
25	2.5	2.6	3.2	2.3	3.7	0.1	6.4	6.4
50	2.6	2.8	3.4	2.4	3.9	0.1	6.8	6.8
100	2.8	3.0	3.6	2.6	4.1	0.2	7.2	7.2

### 2.5.5. Maximum Crest Level

The maximum wave crest elevation at the project site can be estimated by including tide, non-tidal residuals, sea level rise, and wave effects. The tide level is assumed to be equal to the MHHW datum and is discussed in Section 2.5.1. The return interval statistics of the non-tidal residuals are discussed in Section 2.5.2. The return intervals for the waves and non-tidal residuals are assumed to be the same since they are both related to storm events and are not independent. Sea level rise is taken to be 0.25 ft at the end of the design life 50 year design life.

Significant wave height statistics at the site are discussed in Section 2.5.4.1. Assuming a Rayleigh distribution, the maximum wave height can be estimated by multiplying the significant wave height by a factor of 1.86. The crest of the wave above mean water level is estimated to be 65% of the total wave height based on nonlinear shallow water wave theory. Crest heights various return intervals are summarized in Table 2-7. The data indicate the maximum 50- and 100-year crest heights above mean water (still water) level to be 8.2 feet and 8.7 feet, respectively.

Table 2-7: Maximum Crest Height Return Intervals

Return Period (years)	Location							Maximum
	1	2	3	4	5	6	7	
	<b>Maximum Crest Height Above Mean Water Level (feet)</b>							
<b>2</b>	2.1	2.3	2.7	2.0	3.2	0.1	5.6	<b>5.6</b>
<b>5</b>	2.5	2.6	3.2	2.3	3.7	0.1	6.5	<b>6.5</b>
<b>10</b>	2.7	2.9	3.5	2.5	4.0	0.2	7.0	<b>7.0</b>
<b>25</b>	3.0	3.2	3.9	2.8	4.4	0.2	7.7	<b>7.7</b>
<b>50</b>	3.2	3.4	4.1	2.9	4.7	0.2	8.2	<b>8.2</b>
<b>100</b>	3.4	3.6	4.4	3.1	5.0	0.2	8.7	<b>8.7</b>

Maximum wave crest elevation results are summarized in Table 2-8. The data indicate the 50- and 100-year maximum elevations including sea level rise to be 12.4 ft MLLW and 13.2 ft MLLW, respectively.

Table 2-8: Maximum Wave Crest Elevation Return Intervals

Return Period (years)	Location							Maximum
	1	2	3	4	5	6	7	
	<b>Maximum Crest Elevation (feet MLLW)</b>							
<b>2</b>	5.5	5.6	6.1	5.3	6.6	3.5	9.0	<b>9.0</b>
<b>5</b>	6.1	6.2	6.8	5.9	7.3	3.7	10.1	<b>10.1</b>
<b>10</b>	6.4	6.6	7.2	6.2	7.7	3.8	10.7	<b>10.7</b>
<b>25</b>	7.0	7.2	7.8	6.8	8.4	4.2	11.7	<b>11.7</b>
<b>50</b>	7.4	7.6	8.3	7.1	8.9	4.4	12.4	<b>12.4</b>
<b>100</b>	8.0	8.2	9.0	7.7	9.6	4.8	13.2	<b>13.2</b>

The existing North Quay deck elevation is approximately +8.5 ft MLLW (+7.1 ft MSL). Overtopping is likely during storm events with return period higher than 2 years.

For new pier construction, it is desirable to set the pier deck at +10.0 ft MLLW to minimize overtopping conditions at majority of locations within the Inner Harbor.

## 3.0 Field Inspection and Structural Evaluations

### 3.1. Above and Under Water Inspection

M&N performed a Waterfront Facility Inspection (WFI) of the Tinian Inner Harbor bulkhead structures during October 8 – 11, 2014. The effort included inspection of above water and underwater structural components. The following facilities were inspected (see Figure 3-1):

- North Quay – Berths 1, 2, 3, and 4
- Connecting Pier – East and West
- Center Finger
- Outer Finger
- East Quay

Details of the inspection are provided in Appendix B.

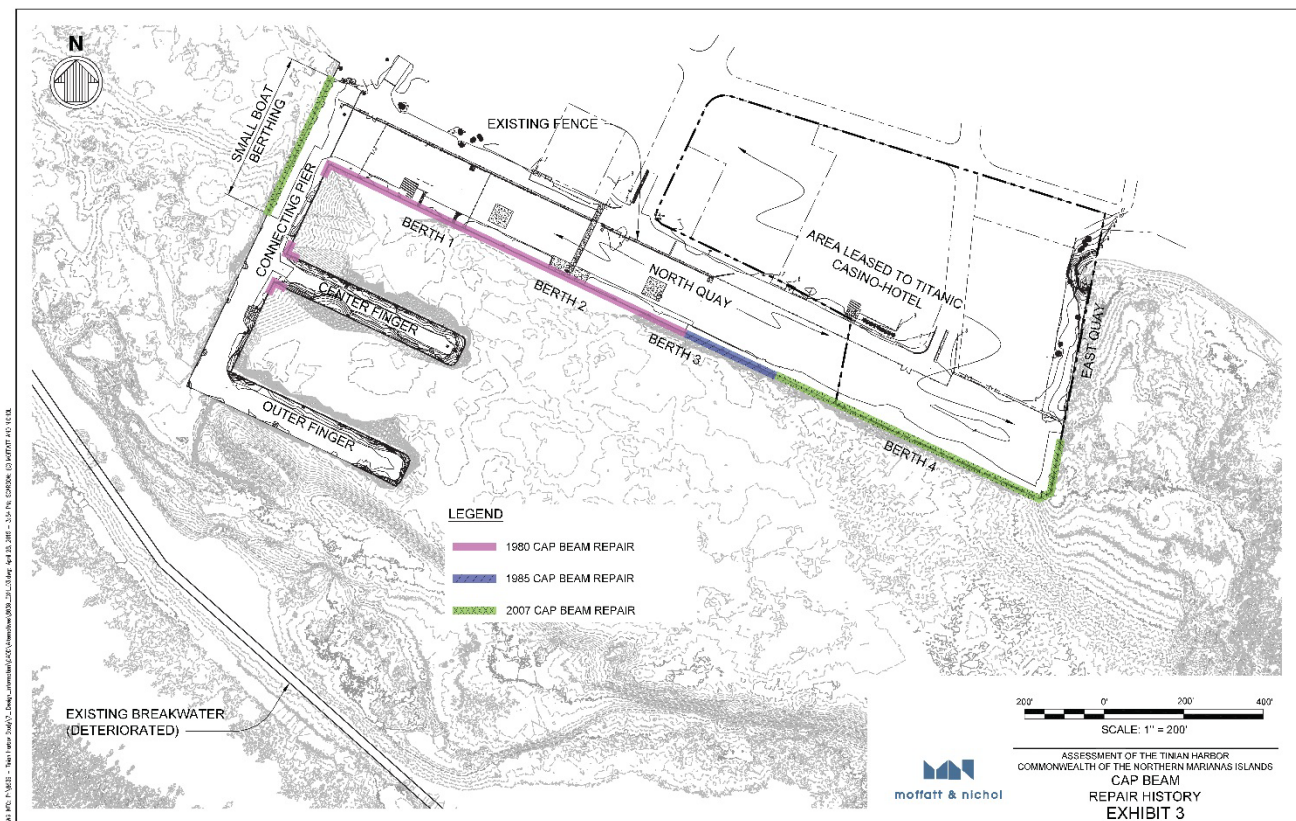


Figure 3-1: Existing Facility and Cap Beam Repair History

### 3.1.1. Findings

**North Quay – Berths 1, 2, and 3 (west end and center).** Berth 2 is actively used by Mobil, other vessels also use Berths 1, 2, and 3 occasionally. Berth 2 has recently undergone a series of improvements: new fender system, concrete cap repairs, and new mooring bollards. Berths 1 and 3 do not appear to have undergone any recent improvements, and isolated areas of concrete cracking and spalling were observed in the concrete cap. The steel sheet pile (SSP) wall was in fairly consistent condition for these three berths. Typical corrosion losses were estimated to be around 20-25%. Corrosion induced section loss was most prevalent in the top 6 ft of the wall, but no holes were observed. There was no coating or cathodic protection observed on any of the SSP walls.



**Photo 3-1.** North Quay, Berths 1 and 2, North Quay looking west.



**Photo 3-2.** North Quay, Berths 2 (left) through 4 (east), looking east.



**Photo 3-3.** North Quay, pile cap/curb. Example of an open concrete corrosion spall.

**North Quay – Berth 4 (east end, including corner).** This berth is not currently in service for mooring and berthing operations. What appears to be a concrete pile cap is actually a large concrete curb that does not encapsulate the SSP wall. This structure acts to retain the existing soil so that the wharf area can be used for miscellaneous equipment storage and staging areas. The tops of the steel sheet piles terminate near the waterline at Mean Sea Level (MSL, +1.37 ft MLLW). Widespread holes in the SSP wall were observed along all of Berth 4 in the top 6 ft. Wall displacements, away from the soil, of up to 20 in. were observed along the

south-facing portion of Berth 4. Berth 4 also wraps around the corner and includes an east-facing portion. In the east-facing portion of this berth, widespread failures of the SSP wall were observed. Strong currents and waves during the site visit rendered close in-water inspection dangerous, so the majority of this portion was inspected above water only. It was clear that the top portion of the SSP wall had displaced in excess of 10 ft away from the soil. Establishing limits on allowable surcharge loads placed near the wall on the North Quay is highly recommended.



**Photo 3-4.** North Quay, Berth 4 with SSP wall extends beyond the concrete curb structure.



**Photo 3-5.** North Quay, Berth 4, east-facing wall with failed SSP wall (yellow outline traces the top of the failed SSP wall)

**Connecting Pier – Northwest Portion.** The northwest portion of the Connecting Pier is used for small craft berthing. The concrete pile cap has recently been repaired and the mooring hardware have recently been replaced. The SSP wall in this area is in similar condition as Berths 1, 2, and 3 of the North Quay; corrosion losses of 20-25%.



**Photo 3-6.** North portion of the West Connecting Pier, looking north. This wall is actively used for small boat mooring.

### Connecting Pier – East and Southwest Portion

The southwest and east portion of the Connecting Pier are no longer in use for active mooring and berthing. Maintenance and repairs for elements in these areas have not been undertaken in many years. All of these structures have outlived their design service lives.



**Photo 3-7.** East side of the Connecting Pier looking south from North Quay Berth 1.



**Photo 3-8.** Connecting Pier, east side, looking southeast towards Center Finger.



**Photo 3-9.** Connecting Pier, southwest side, looking south with the breakwater in the background.

### Center and Outer Finger Piers

The Finger Piers are no longer in use for active mooring and berthing. Maintenance and repairs for elements in these areas have not been undertaken in many years. All of these structures have outlived their design service lives.



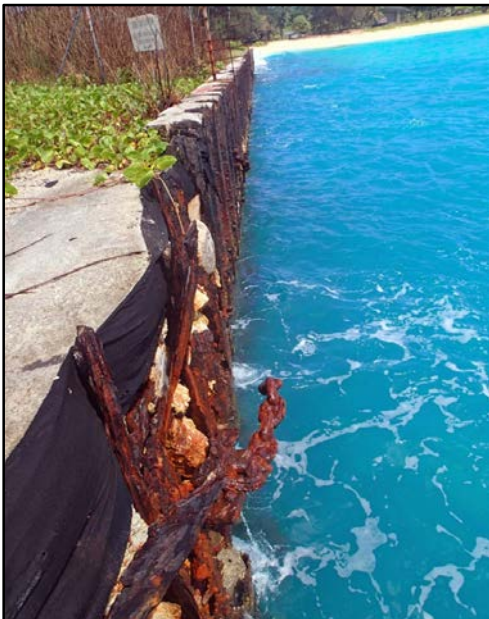
**Photo 3-10.** Outer Finger Pier (left) and Center Finger Pier (right) with Breakwater in the background.



**Photo 3-11.** Center Finger, southeast corner showing typical conditions of Finger Pier SSP wall.

### East Quay

The SSP exhibited heavy corrosion on all visible areas. This wall is serving as an earth retaining structure, but is not used for mooring and berthing. The land area behind the wall is heavily vegetated and does not appear to be used for storage that generates significant surcharge loads.



**Photo 3-12.** East Quay, looking north. The inspection team did not have good access to this portion of the wall, but it was clear that the SSP wall is very corroded. Large holes and displaced areas are widespread.

### 3.1.2. Conclusion

Berths 1, 2, and 3 of the North Quay and the northwest portion of the Connecting Pier are actively being used and every effort should be made to keep these berths operable. The remaining areas of the Inner Harbor have outlived their respective service lives and are not suitable for mooring and berthing activities. Any change in the current configuration or operation of the harbor will necessitate a major renovation or replacement.

### 3.2. Structural Evaluation of Existing Wharf Structures

Based on the results of the structural field inspection and geotechnical boring program, capacities of the existing structures were evaluated. The evaluations were supplemented by limited available information (mostly geometrical properties) presented on record drawings for the facility. Layout of the existing facility and cap beam repair history are shown in Figure 3-1.

A typical section of the original quay wall from 1945 construction is shown in Figure 3-2 below. This typical section is anticipated to be representative of areas that have not undergone repairs since the original construction (majority of connecting pier and all finger piers).

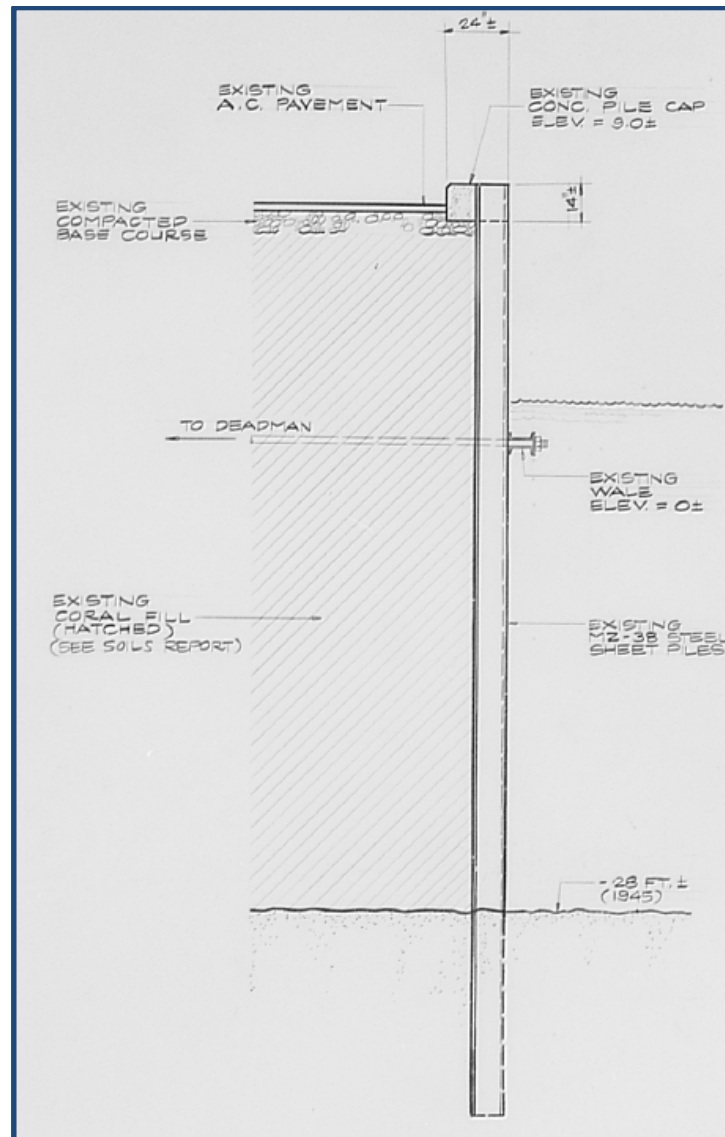


Figure 3-2: Typical Section - Original (1945) Quay Wall



### 3.2.1. Data Gaps

Due to limitations in available construction record and/or as-built drawings, assumptions were used in order to evaluate the structural capacity of the existing quay wall bulkheads. The data gaps include the following:

- The steel grade for the existing bulkhead components (steel sheet piles, tie rods, walers, etc.);
- Tie rod and waler sizes and anchor structural details;
- The design loads on the pavement behind the wall; and,
- The as-built tip elevation of the steel sheet piling.

In order to analyze the existing bulkhead, assumptions were made and methodology was developed to evaluate the structure using commonly accepted design criteria and standards for steel sheet pile bulkhead at the time of the original design. The assumptions and analysis methodology are described below.

### 3.2.2. Assumptions, Analysis Methodology and Results

The existing bulkhead system was evaluated to confirm whether the current conditions would require significant structural improvements. The evaluation of the existing conditions of the sheet pile bulkhead was performed utilizing the following assumed data:

- Sheet Pile Section = MZ-38 as shown on Seabee's Waterfront Installation drawing with a minimum yield of 33 ksi.
- Condition of wall evaluated for both original (non-corroded and without deterioration) thicknesses to establish a performance baseline, and current (corroded and deteriorated) thicknesses based on the results of the inspection to establish current capacities.
- Original design Dredge Elevation = -28 ft MLLW, as shown on Seabee's drawing
- Original design Surcharge Load = 400 psf, per Navy's 1938 Design Data
- Current operation Surcharge Load = 250 psf, a reasonable reduced load approximately equivalent to "one-high" stack of container and is same as "heavy storage warehouse" load as specified in IBC.
- The embedment length of the sheets was not identified on any of the available record drawings/documents. The assumed embedment length is based on the minimum requirements to meet static equilibrium using the data above, free earth support conditions at the toe, and a factor of safety against overturning of 1.5.
- The tie rod size and spacing was not identified on any of the available record drawings or documents.

The results of the evaluation are as follows:

#### Original Condition – Static Earth Pressure plus 400 psf Surcharge

- The estimated minimum tip elevation is El. -42 ft MLLW.
- The estimated maximum bending stress is 23 ksi, or 71% of the minimum yield. The target allowable stress is 65 percent of minimum yield (value from USS Steel Sheet Piling Design Manual, July, 1975).

- The estimated tie rod force is 11.4 kip/ft. Assuming that the bulkhead was built using a common 2-1/4 inch diameter rod, with 33 ksi minimum yield strength, this would translate to tie rods being spaced at 7 ft centers – this seems reasonable. The target (allowable stress) is 60 percent of minimum yield (value from USS Steel Sheet Piling Design Manual, July, 1975).
- Very low seismic load was considered in the original design per Navy's 1938 Design Data.

#### Current Corroded/deteriorated Condition – Static Earth Pressure plus 250 psf Surcharge

- A tip elevation of El. -42 ft MLLW was used to remain consistent with the assumed existing condition.
- Current water depth is shallower than -28 ft MLLW due to sediment filling. The filling material is assumed to be soft. Passive resistance of this soft fill layer is not considered in the structural analysis.
- The corroded section properties are approximately 75% of the original section properties based on the results of the field inspections (20% reduction in flange thicknesses and 30% reduction in web thickness).
- The estimated maximum bending stress is 30 ksi, or 91% of the minimum yield. The target allowable stress is 65 percent (value from USS Steel Sheet Piling Design Manual, July, 1975), therefore, the sheet pile would be overstressed.
- The estimated tie rod force is at 10.5 kip/ft, lower than the original condition; however, the condition of the tie rods is not known. Excavation and inspection of the tie rods during a future phase of the project is recommended.
- Since the application of static earth pressure and live loads appear to exceed the deteriorated sheet pile allowable stress limits, the reserved strength of the sheet pile will not be adequate to resist the seismic loads, which is a current code requirement.
- Recommend to restrict placing live loads (250 psf uniform loads or other heavy equipment and vehicles) within 20 ft of the face of the bulkhead.

### **3.2.3. Previously Repaired and Salvageable Harbor Areas**

#### ***3.2.3.1. North Quay Berths 1, 2 and 3***

North Quay, Berths 1, 2 and 3 cover approximately 1,000 linear feet and appear to be of similar construction (see Figure 3-3 for typical section). The configuration shown on Figure 3-3 is based on quay wall repair project completed in 1980 and 1985 (see record drawings by Gillman, Koebig & Koebig, Inc.) The repair involved installation of a cast-in-place, reinforced concrete cap beam encapsulating the top of the existing sheet piles, the tie rods and the waler system. The existing steel sheet piles were cut-off approximately 6 inches above the elevation of tie rods, possibly due to severe corrosion and deterioration observed at the time of repair.

Berth 2 is actively used by Mobil. The mooring and fender systems at Berth 2 have been upgraded and the concrete cap beam was repaired in 2011 (see design drawings by Winzler and Kelly). Berths 1 and 3 are also being used occasionally. However, the mooring and fender systems of Berths 1 and 3 are not adequate to support the berthing of vessels identified in Paragraph 4.2.7 which have been identified by stakeholders and others as potential visiting Tinian Harbor. In addition, repairs to the concrete cap beam and wharf pavements

at Berths 1 and 3 are required in order to support regular operations. At Berths 1 and 3, upgrading the mooring and fender system together with repairing the concrete cap beam and paving the wharf area would restore the usefulness of these berths and keep them operational in the short term.

Based on the analysis in Paragraph 3.2.2, the current corroded steel sheet pile at Berths 1, 2 and 3 has little capacity to support wharf live load and withstand the current design earthquake load. The quay wall for Berths 1, 2 and 3 is serviceable to support the current level of operation. To minimize further corrosion, installation of a cathodic protection system can be considered for the interim. Replacement of the steel sheet pile wall would be required eventually in order to fully restore and improve the capacity of the berths and strengthen the quay wall to meet the current seismic requirements. This level of renovation can be deferred to accommodate current funding limitations.

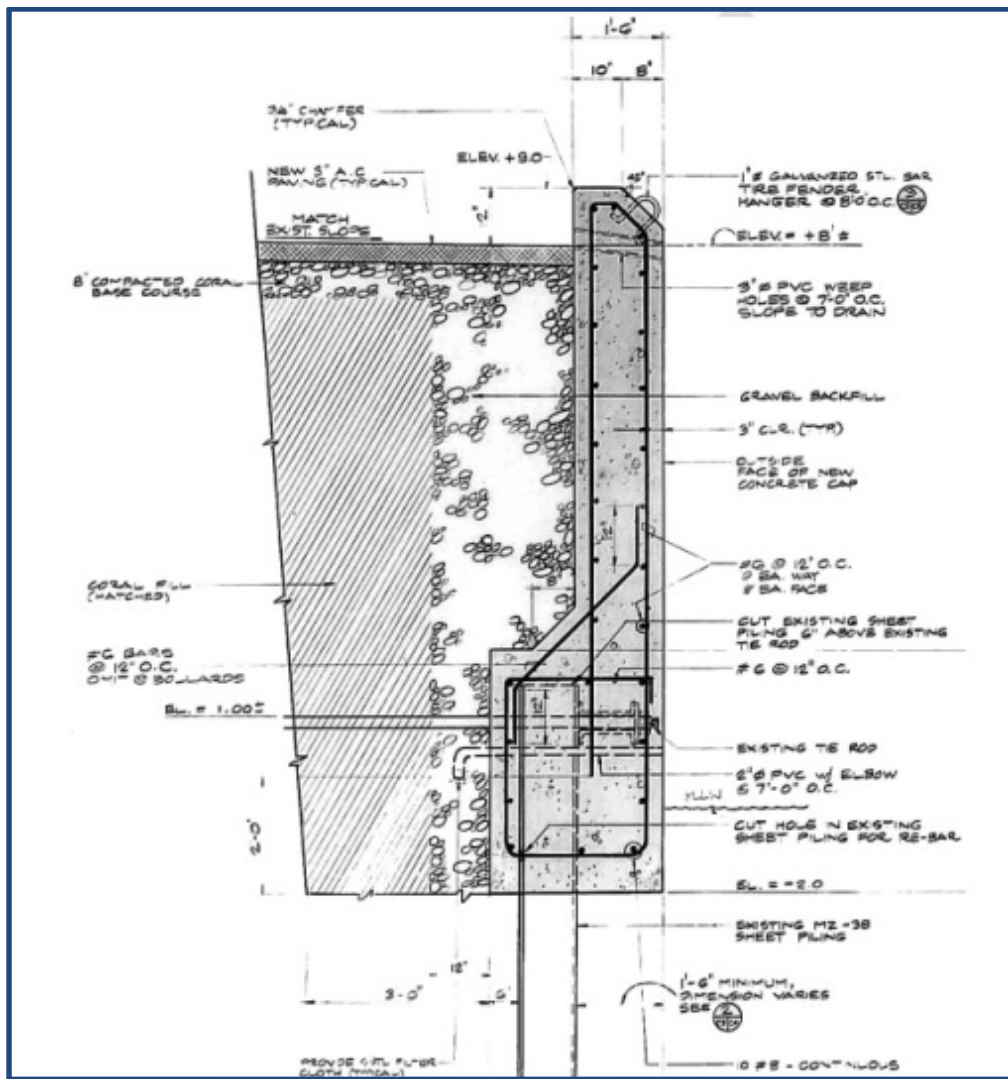


Figure 3-3: Typical Section - North Quay Berths 1, 2 and 3

### 3.2.3.2. North West Portion Connecting Pier

Approximately 385 lineal feet of the northern portion of the west quay wall for the Connecting Pier was repaired under an emergency quay wall repair project around approximately 2007 (see drawings by FPA Pacific Corp.) The repair involved installation of a cast-in-place, reinforced concrete cap beam directly above and behind the existing steel sheet pile wall (see Figure 3-4). The existing steel sheet piles were cut-off approximately above the high water elevation, possibly due to removal of severe corrosion and deterioration observed at the time of repair. The existing waler and tie-back rods remain exposed on the waterside of the structure.

This area is currently being used to berth small crafts and upgrading or strengthening of the steel sheet pile wall in this area to support heavy live load is not required. Life extension of the steel sheet pile wall system would be desirable. To minimize further corrosion, installation of a cathodic protection system can be considered. In addition, repair of the concrete cap would also be desirable. Strengthening or replacement of the wall would be required to meet the current seismic requirements.

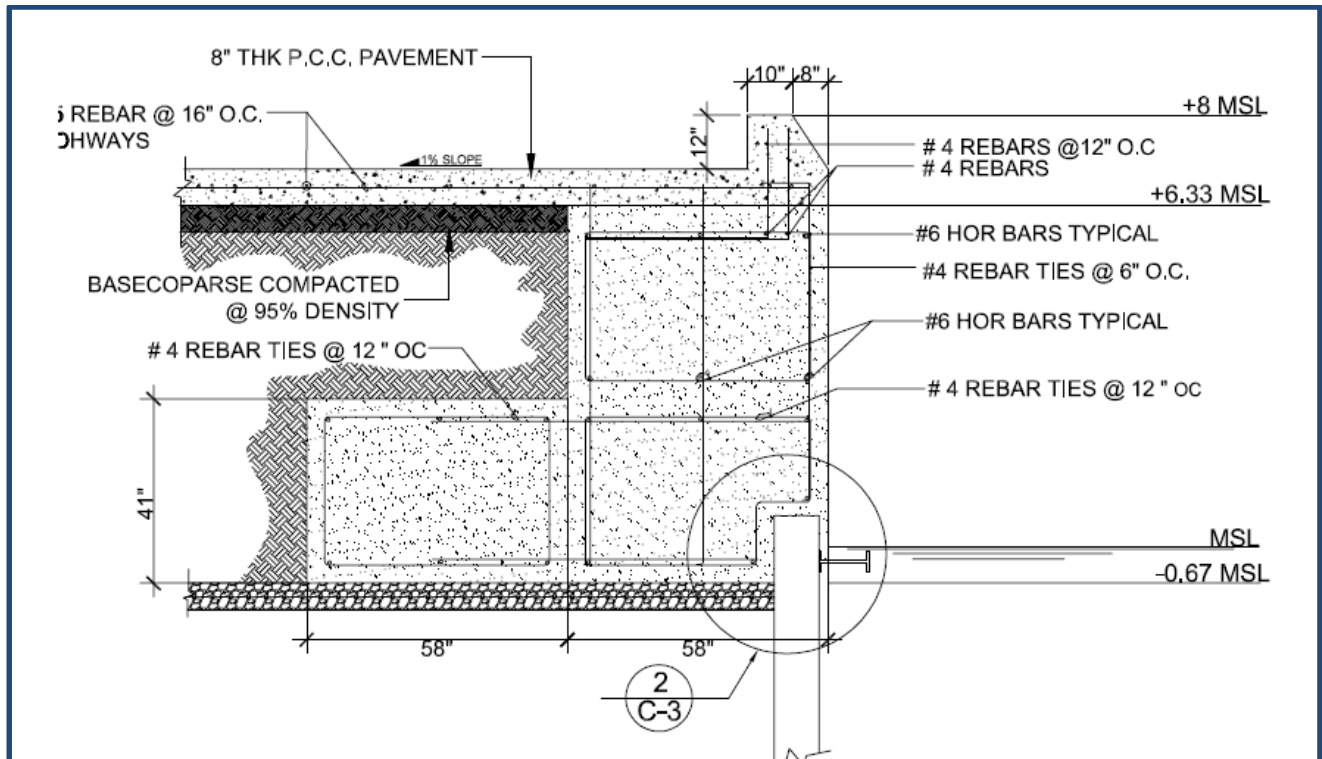


Figure 3-4: Typical Section - Connecting Pier, North West Portion

### 3.2.4. Harbor Areas Beyond Salvage

#### 3.2.4.1. North Quay - Berth 4

North Quay - Berth 4, approximately 730 linear feet and the east facing quay wall (approximately 140 ft) were repaired under an emergency quay wall repair project around 2007 (see drawings by FPA Pacific Corp.) The repair involved installation of a cast-in-place, reinforced concrete element directly behind the existing

bulkhead as shown on Figure 3-5. The typical section does not identify a tie-back system. The existing steel sheet piles were cut-off approximately above the high water elevation, possibly due to severe corrosion and deterioration at the time of repair.

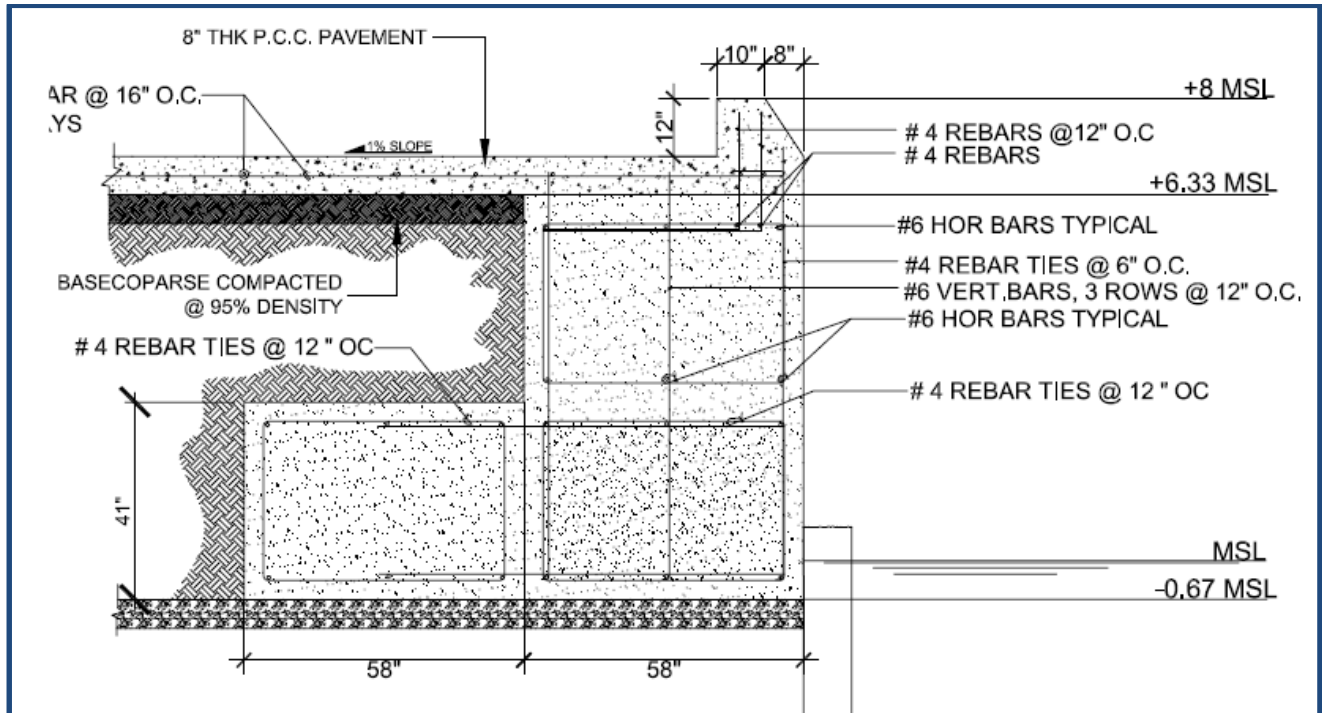


Figure 3-5: Typical Cross Sectional View Through Berth 4 on North Quay

As stated in Paragraph 3.1.1, areas along the North Quay - Berth 4 and the east facing quay wall are leaning outward or have failed. This portion of the facility is considered to be in a critical condition and would require major rehabilitation work.

#### 3.2.4.2. Balance of the Harbor Areas

The remaining berths at the existing facility, including the majority of the Connecting Pier, except the Northwest portion, the Outer and Center Finger Piers and the East Quay were found to be in a critical state of disrepair and many portions of the existing SSP wall are severely deteriorated and have collapsed. These facilities are condemned and are not being used and therefore a structural evaluation of these structures is not warranted. Rehabilitation options to these areas will be needed to modernize the harbor facility.

### 3.3. Water, Fire Protection and Drainage

Planned improvements that will be included are potable water, fire protection and drainage systems. These improvements will be required to meet CPA, U.S. Coast Guard (USCG), Bureau of Environmental and Coastal Quality (BECQ), and other Government agencies regulations.

#### 3.3.1. Water

A potable water system will be required and will consist of a small diameter pipe running along the piers to include anti-siphon hose bibb (faucet) to be appropriately spaced (See Appendix A, Exhibit 29).

### **3.3.2. Fire Protection**

A seawater fire pumping system project for the Port of Tinian is ongoing. All firefighting system additions will be integrated with this system, and will meet the requirements of the USCG (See Appendix A, Exhibit 28).

### **3.3.3. Drainage**

Curbs along the quay, and inlets appropriately spaced will likely be provided. The field inlets will be appropriately placed on the pier pavement. If sediment is determined to be problem, a retention area will have to be provided prior to discharge of storm waters to the coastal waters. If the risk of oil contamination is determined to be unlikely but possible, an oil water separator may have to be included (See Appendix A, Exhibit 27).

### **3.4. Lighting**

Lighting on poles currently exist along the backland of the North Quay. This lighting system will be expanded to cover the Connecting Pier and Finger Pier (See Appendix A, Exhibit 30).

## 4.0 Basis of Design

### 4.1. General Requirements

The current Tinian Harbor Master Plan was prepared in 1997 and it has not been updated since its original preparation. This Basis of Design is to validate and update the pier and wharf area requirements as described in the Master Plan.

### 4.2. Design Vessels

The Master Plan stated the following:

“The design vessel is assumed to be the typical cargo vessel which services Saipan at present. These vessels (Micronesia Heritage, Micronesia Navigator) have a draft of 27 feet and a length of 424 feet.” Characteristics of these two cargo vessels are provided below:

#### Micronesia Navigator (container vessel) – see Photo 4-1

Deadweight Tonnage (DWT)//GT	12,742 Tons
Gross Tonnage (GT)	9,048 Tons
Length overall	423 ft
Beam/Width	79 ft
Draft, light loaded	N/A
Draft, fully loaded	26.2 ft
Capacity (TEU's)	N/A



**Photo 4-1.** Micronesia Navigation Container Vessel

**Armada Permata (former Micronesia Heritage; container vessel) – see Photo 4-2**

Deadweight Tonnage (DWT)	12,723 Tons
Gross Tonnage (GT)	9,048 Tons
Length overall	423 ft
Beam/Width	79 ft
Draft, light loaded	N/A
Draft, fully loaded	22 ft
Capacity (TEU's)	N/A

**Photo 4-2.** Armada Permata Container Vessel

During the stake holder meeting, the several types of vessels were identified as potential visitors to the Tinian Harbor. Also other types of vessels are known to have visited Tinian harbors. These vessels and their characteristics are as described below:

**4.2.1. Oil tankers for Mobil Oil Mariana Islands, Inc.****Golden Micronesia – see Photo 4-3**

Deadweight tonnage (DWT)	9,091 Tonnes
Gross Tonnage (GT)	N/A
Length overall	394 ft
Beam/Width	58.4 ft
Draft, light loaded	5.2 ft
Draft, fully loaded	25.9 ft





**Photo 4-3.** Golden Micronesia Oil Tanker

**Golden Akane – see Photo 4-4**

Deadweight Tonnage (DWT)	8,969 Tonnes
Gross Tonnage (GT)	N/A
Length overall	369 ft
Beam/Width	62.3 ft
Draft, light loaded	5.3 ft
Draft, fully loaded	24.6 ft



**Photo 4-4.** Golden Akane Oil Tanker

#### 4.2.2. Cruise Vessels

##### MS SILVER EXPLORER (recently visited Tinian) – see Photo 4-5

Deadweight Tonnage (DWT)	N/A
Gross Tonnage (GT)	6,130 Tonnes
Length overall	354 ft
Beam/Width	51.2 ft
Draft, light loaded	N/A
Draft, fully loaded	14.4 ft
Capacity	132 passengers



Photo 4-5. MS SILVER EXPLORER Cruise Vessel

##### MV Discovery (currently named AMEN, possibly visited Tinian/Saipan) – see Photo 4-6

Deadweight Tonnage (DWT)	N/A
Gross Tonnage (GT)	20,186 Tonnes
Length overall	554 ft
Beam/Width	81 ft
Draft, light loaded	N/A
Draft, fully loaded	24.6 ft
Capacity (TEU's)	N/A



**Photo 4-6.** MV Discovery Cruise Vessel

**MS Statedam (current visiting Saipan) – see Photo 4-7**

Deadweight Tonnage (DWT)	N/A
Gross Tonnage (GT)	55,451 Tonnes
Length overall	719 ft
Beam/Width	101 ft
Draft, light loaded	N/A
Draft, fully loaded	25 ft
Capacity (TEU's)	N/A



**Photo 4-7.** MS Statedam Cruise Vessel

This vessel is over 700 feet long and is too long to visit Tinian Harbor inside the breakwater. This size of cruise ship would be anchored outside of the breakwater. Tourist from this cruise ship would be ferried between the anchored vessel and the piers or quay.

### 4.2.3. Military

#### JOINT HIGH SPEED VESSELS (JHSV) (planned to visit Tinian) – see Photo 4-8

This vessel comes with a side stern ramp (shown in photos) or a center stern ramp. A version of this vessel are used as ferry.

Deadweight tonnage (GWT)	1,515 Tonnes
Gross Tonnage (GT)	N/A
Length overall	338 ft
Beam/Width	93.6 ft
Draft, light loaded	N/A
Draft, fully loaded	12.7 ft

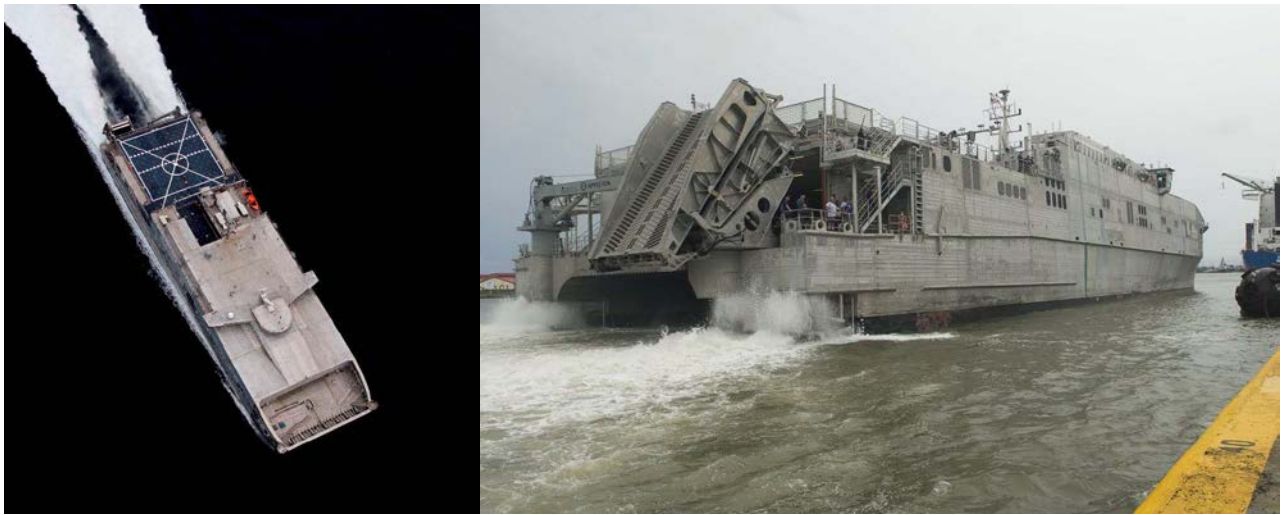


Photo 4-8. Joint High Speed Vessel

#### INTEGRATED-TUG-BARGE (ITB) Thunder-Lightning (recently visited Tinian) – see Photo 4-9

Deadweight Tonnage (DWT)	16,370 Tonnes
Gross Tonnage (GT)	N/A
Length overall	550 ft
Beam/Width	65 ft
Draft, light loaded	N/A
Draft, fully loaded	22 ft



**Photo 4-9.** ITB Thunder Lightning MSC Cargo (right-berthed at North Quay)

**4.2.4. Cargo Vessels**

In addition to the cargo vessels identified in the Master Plan, the following cargo vessels have been identified to operate between Saipan and Tinian recently.

**WANG SHUN (local cargo vessels between Tinian and Saipan)**

Deadweight Tonnage (DWT)	N/A
Gross Tonnage (GT)	N/A
Length overall	318 ft
Beam/Width	53 ft
Draft, light loaded	N/A
Draft, fully loaded	19 ft

**4.2.5 Ferry**

**TINIAN EXPRESS (operation terminated recently) – see Photo 4-10**

Deadweight Tonnage (DWT)	N/A
Gross Tonnage (GT)	475 Tonnes
Length overall	131 ft
Beam/Width	N/A
Draft, light loaded	N/A
Draft, fully loaded	7.9 ft
Capacity	333 passengers



**Photo 4-10.** Tinian Express Ferry Vessel

#### 4.2.6 Other vessel and Watercraft

These vessels and watercrafts do not dictate the dredge depth. The pier and wharf layout shall accommodate special conditions of these vessels/crafts

#### **CARGO LANDING CRAFT – Pacific Marine I – see Photo 4-11**

This watercraft occasionally visits Tinian to deliver cargos from Saipan. A ramp shall be provided to allow loading/unloading of cargos or small vehicles via the bow ramp on the boat.



**Photo 4-11.** Pacific Marine I (berths at Berth 1, North Quay)

#### **Tug Boat – see Photo 4-12**

Tug boats sometime are needed to assist larger vessels to berth at Tinian Harbor.



**Photo 4-12.** Tug Boat (berths at Berth 1, North Quay)

#### 4.2.7 Summary

The following vessels/boats will be used for berthing consideration:

Vessel or Type	Overall Length (Feet)	Beam (Feet)	Draft (feet)
General Cargo Vessel	320	53	19
Container Cargo Vessel	430	80	26.5
Cruise Vessel (Small)	355	51	14.5
Cruise Vessel (Medium)	555	81	24.6
Oil Tanker	370	58	26
JHSV	338	94	12.7
ITB	550	65	22
Ferry Vessel	135	30	8
Cargo Landing Craft	85	25	N/A
Tug Boat	100	35	N/A

### 4.3. Structural

#### 4.3.1. Design Live Loads

For current North Quay Berths 1, 2 and 3 (load to be applied at least approximately 20 feet from the face of the quay wall)

Uniform Load	250 psf
Truck Load	AASHTO HS20-44
Mobile Truck Crane	50 Short ton, including outrigger loads (as observed on North Quay)
Forklift	10 Short ton (as observed on North Quay)

For new or replaced piers and quay walls

Uniform Load	600 psf (no uniform load on Connecting Pier) (per UFC 4-152-01 Design: Piers & Wharves)
Truck Load	AASHTO HS20-44
Mobile Truck Crane	50 Short ton including outrigger loads (no mobile crane operation on Connection Pier) (same as current requirement)
Forklift	10 Short ton (same as current requirement)

#### 4.3.2. Wind Load

As required by International Building Code (IBC)

#### 4.3.3. Mooring Loads

For current North Quay Berths 1, 2 and 3

66 Short Ton bollard capacity (at Mobile Berth (Berth 2) only)

Use of bollards at Berths 1 & 3 for large vessels is not recommended

For new or replaced piers and quay walls

100 Short Ton bollard capacity (spacing and optimal bollard capacity to be determined during design phase)

#### 4.3.4. Berthing Loads

Maximum berthing approach velocity of 0.6 feet/second (for moderately protected harbor per UFC 4-152-01, Design: Piers and Wharves)

#### 4.3.5. Seismic Loads

For current North Quay Berths 1, 2 and 3

Not considered (Seismic upgrade deferred)



For new or replaced piers and quay walls

In accordance with UFC 4-152-01, Design: Piers and Wharves, IBC 2012 or applicable version at the time of final design

#### 4.3.6. Load Combinations

The load combination shall at minimum comply with the requirements of UFC 4-152-01, Design: Piers and Wharves or UFC 4-152-01, Design: Piers and Wharves, Table 3-7. The following load combinations shall be used to analyze the bulkhead walls.

##### Allowable Stress Design

D	=	Dead load
$L_u$	=	Live load (uniform)
$L_c$	=	Live load (concentrated)
I	=	Impact load (for $L_c$ only)
B	=	Buoyancy load
$B_e$	=	Berthing load
C	=	Current load on structure
$C_s$	=	Current load on ship
E	=	Earth pressure load
EQ	=	Earthquake load

VACANT	1(a)	2(b)	3(c)	4(d)	5(e)	6(f)	7(g)	8(h)
D	1	1	1	1	1	1	1	1
L	0	1	0	0.75	0	0	0.75	0.75
B	1	1	1	1	1	1	1	1
$B_e$	0	0	0	0	0	0	0	0
C	1	1	1	1	1	1	1	1
$C_s$	0	0	0	0	0	0	0	0
E	0	1	1	1	1	1	1	1
EQ	0	0	0	0	0	0.7	0	0.525

#### 4.3.7. Water Level

Water level information is provided in Paragraph 2.5.1.

## 5.0 Navigation and Dredging

### 5.1. General Requirements

Tinian Harbor has historically provided navigation and protection beginning with WWII supply offloading up to current commercial and Navy vessels. The harbor channels have begun to infill reducing available water depth and causing limitations on vessel movement within the harbor as well as decreased protection from an aging and deteriorating breakwater. The channel layout will generally follow existing navigation buoy limits with potential expansion in limited areas to accommodate turning for longer vessels. The historical and proposed dredge material disposal scheme will consist of offloading dredge material to land and stockpiling the material on a vacant property. The property found to be able to accommodate the dredge material is located within either of two abandoned quarry sites as described in the following paragraphs.

#### 5.1.1. Design Vessels

The design vessels under consideration are covered in Section 4.2. The deepest vessel in the fleet to be used for design depth is the Micronesian Navigator provided in the 1997 Tinian Harbor Master Plan document with a posted depth of 26.2 feet and beam of 80 feet. The longest and widest vessel to be used as turning basin design is the MV Discovery (Currently named the 'AMEN') with a length overall (LOA) of 555 feet and beam of 81 feet. Note that the MV Discovery is currently not operating in Tinian. Should it be determined that the MV Discovery will not operate in Tinian, the next design vessel with the greatest LOA is the ITB Thunder/Lightning, an articulated barge pushed by tug (with an LOA of 550 feet). This ITB recently visited Tinian Harbor during M&N's inspection period so it is anticipated that the existing turning basin dimensions are sufficient for operations.

#### 5.1.2. Design Criteria

The design for Navy channels is governed by UFC 4-150-06, Military Harbor and Coastal Facilities. Commercial harbors use PIANC – Approach Channels, A Guide for Design. The design for this facility will include the minimum criteria for each facet (i.e., design width, turning basin, and vessel draft). In some cases the existing navigation channel limits will be maintained due to successful operations in the area under a wide range of vessels and conditions.

### 5.2. Channel and Turning Basin Design

The current approach channel as shown on NOAA navigation charts 81071 is buoyed for a width of approximately 800 feet. The interior approach narrows slightly to approximately 500 feet and then expands into the turning basin and mooring area to 800 feet. The interior basin is limited by the distance between the North Quay bulkhead wall and breakwater to 800 feet. The Navigation chart posts existing navigation depths to be -27 feet MLLW for the approach channel and -24 feet MLLW in the berthing area. The original construction was dredged to -32 feet MLLW for the approach channel and -28 feet MLLW in the berthing area as documented in historical navy construction narratives. USACE planning documents prepared in 1981 state that the original construction was -30 and -28 feet MLLW. This could result in a potential inconsistency, however, none of the alternatives are proposed any deeper than -30 feet, so this will not have a bearing on the outcome. The current proposed dredge plan for harbor layout Alternative 3 is shown on Figure 5-1 (dredging plans for other alternatives are similar and are provided in Appendix A, Exhibits 13 and 14).

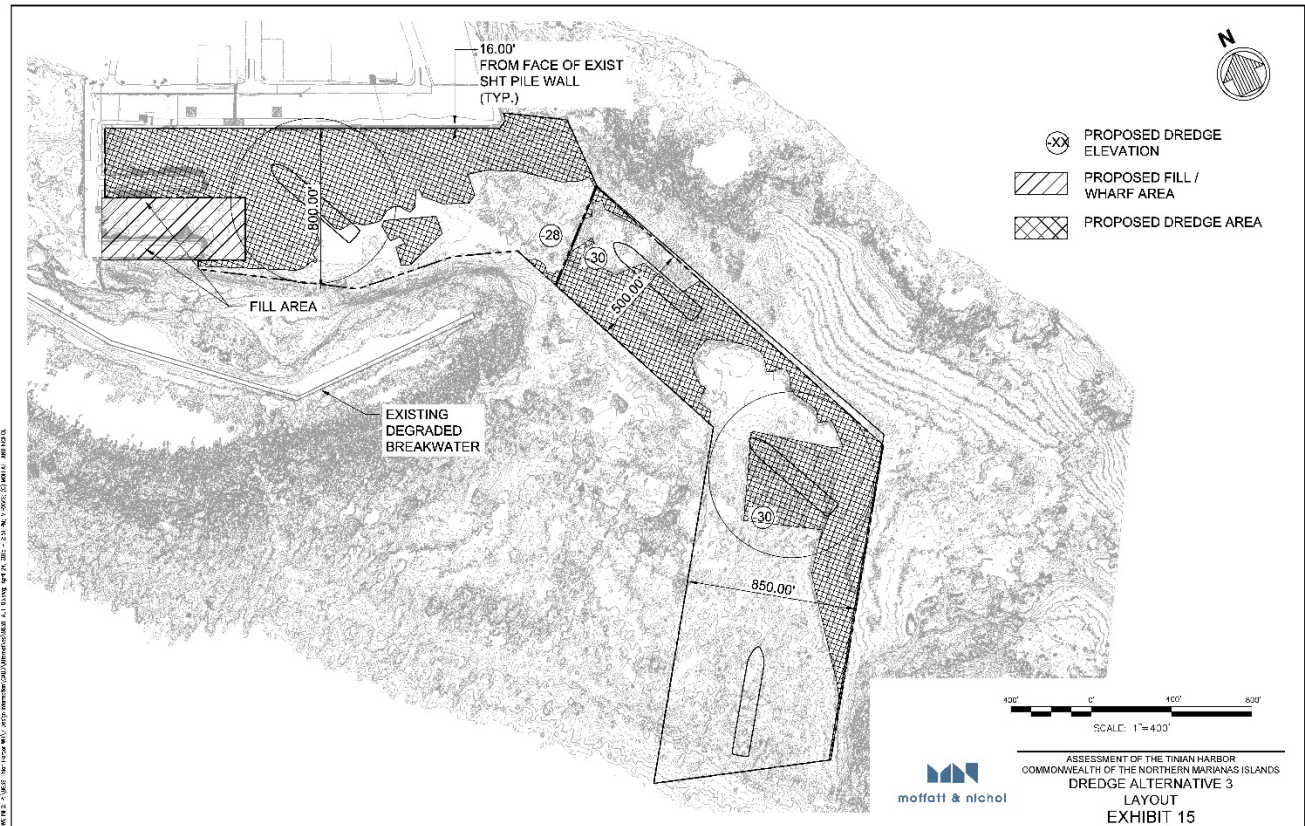


Figure 5-1: Channel and Turning Basin Dredge Plan - Alternative 3

### 5.2.1. Approach channel design

Design guidelines state an approach guideline of 5 times the vessel beam if available, or a minimum of 3 times the vessel beam if constricted, which for the widest vessel would be 5 x 81 ft= 405 ft, or 3 X 81 ft= 243 ft. Channel depth appears to have been possibly originally constructed to a depth of -30 or -32 feet MLLW. The maximum draft vessel currently using the channel has a fully loaded draft of 26.5 feet (Micronesia Navigator). Using design guidelines within UFC 4-150-06, Military Harbor and Coastal Facilities would correspond to a -30 feet MLLW navigation draft.

### 5.2.2. Turning Basin Design

The design guidelines for turning basin width is for a maximum of 2 and minimum of 1.5 times the vessel length. This harbor can accommodate turning of the largest vessels and would need to be 850 wide (550 feet \* 1.5). The existing turning radius is 800 feet which appears to be adequate since current operations have continuous successful movements in this area. Turning basin and berth depth appears to have been possibly originally constructed to a depth of -28 feet MLLW. The maximum draft vessel currently using the interior basin and channels has a fully loaded draft of 26.5 feet (Micronesia Navigator). Using design guidelines within UFC 4-150-06, Military Harbor and Coastal Facilities would correspond to a -30 feet MLLW navigation draft. A slightly light loaded condition would allow a basin and berth depth of -28 feet MLLW, which has been sufficient for past operations.

### 5.3. Fill/Disposal Locations & Requirements

Fill disposal is required for up to 300,000 cubic yards of material if the entire entrance and basin is dredged to -30 feet MLLW. Dredge depths were investigated for both a continuous -30 foot channel and basin as well as a combined -30 foot approach channel with -28 foot turning basin/berth. Dredge volumes vary depending on the alternative selected below and bathymetry, which will vary over time to include additional shoaling. The total amount of dredge material including a one foot overdepth allowance would vary between 230,000 cubic yards (cy) to 400,000 cy.

Suitable dredged material might be used as fill. All unsuitable dredged material will have to be cleared away and disposed. Available reuse of the material within the alternative berth layouts would be between 125,000 and 215,000 cy. Material with excess rock sizes would require processing prior to reuse.

Excess dredged materials and deleterious materials will likely have to be disposed inland. Two known potential disposal sites are the following.

- Property known as the “Old Hofschneider Quarry” below the Carolinas Heights.
- The “Old Quarry” below the Pina Plateau.

Locations of these two potential disposal sites are shown on Appendix A, Exhibit 16.

### 5.4. Unexploded Ordnance

The Tinian Harbor facilities were used extensively during WWII to transfer war munitions cargo. Portions of these munitions were accidentally lost overboard and at the end of the war some of the unexploited ordnance (UXO) was disposed of by dumping in the ocean. A large portion of the more dangerous UXO (fragmentation cluster bombs) was found and removed from the bottom of the harbor near the Tinian Ferry landing in October and November 2000 (Final Report ‘Unexploded Ordnance Clearance US Fragmentation Bombs, Port of Tinian).

Following their removal, the site was inspected visually and no additional items were visible from the surface. However, it is possible that both additional cluster bombs and other smaller UXO exist buried in the seabed and scattered in the basin. Dredging and sheet pile driving may disturb buried UXOs, and it is recommended that surveying and monitoring for UXOs be completed in the affected areas ahead of any construction activities. In addition, material placed in upland sites should be screened to remove any entrained UXO entering the dredge material. Dredge equipment will require reinforcement to safeguard personnel as well. The large amount of dredge material will require a significant amount of additional time for screening.

Material placed within the alternative shoreline improvement boundaries as fill will not require screening, however, the fill material must be capped with asphalt or concrete decking to avoid exposure to individuals and activity on the surface.

### 5.5. Construction Equipment and Considerations

The dredging work for depths within previous boundaries would be considered maintenance work and could be accomplished with standard dredge equipment. The upland disposal requirement introduces a practical limitation away from hydraulic equipment such as hopper dredge and cutter suction. Therefore the most likely dredge equipment would entail mechanical dredges such as clamshell, backhoe, or dipper dredge. A portion

of the work under any deepening scenario would require some hard material that would need bucket weights and hoisting capability to break the material. Some local projects in Guam have also employed the use of a chisel in limited areas to break the material. For deepening beyond the originally constructed depths extensive rock dredging would be required. Due to the potential for unexploded ordinance (UXO) within the dredge area the dredge equipment would need to be modified to add armor systems to protect the operator and crew. At least one barge would be necessary to transport the dredge material to an offloading location along the shore that would be loaded into trucks (or the new reclaimed berth area) and transported to the quarries for disposal. Current Navy requirements have also included screening of the dredge sediments to remove/disable any ordinance. Specialists in munitions would need to be hired to perform these tasks and would need to be accounted for in cost estimates and scheduling. It may be possible to use the derrick barge for both dredging and pile driving work which could limit the number of major equipment pieces needed to mobilize to the site.

## 6.0 Harbor Layout Alternatives

### 6.1. Alternative Layouts

The original Tinian Inner Harbor configuration was designed to berth eight Liberty class ships at the same time. Characteristics of Liberty Ship are:

- Length 441.5 ft
- Beam – 57 ft
- Draft – 27.8 ft

The modernized Tinian Inner Harbor facilities should be able to accommodate longer and wider vessels at the same time in the future (see Paragraph 4.2 for type and size of vessels being considered). Therefore, the existing harbor layout appears to have the following deficiencies:

1. Basin width between North Quay and Center Finger Pier and between Center Finger Pier and Outer Finger Pier appear to be too close to effectively berthing vessels at both sides of the basins.
2. The two finger piers are 80 feet wide. This width appears to be too narrow to accommodate movement of pier side vehicles, cargos and passengers effectively and safely, especially when both sides of the pier are occupied by vessels.
3. Berthing of vessels at south face of the Outer Finger Pier and west face of the Connecting Pier is not possible due to access and water depth constraints.

### 6.2. Alternative 1 – 500-ft Long x 425-ft Wide Finger Pier

This alternative involves filling-in the basin between the Center Finger Pier and Outer Finger Pier resulting in a 500-ft long by 425-ft wide pier with a total of 925 linear feet of berthing face. An unloading ramp is provided at the junction between the North Quay and the Connecting Pier (See Figure 6-1).

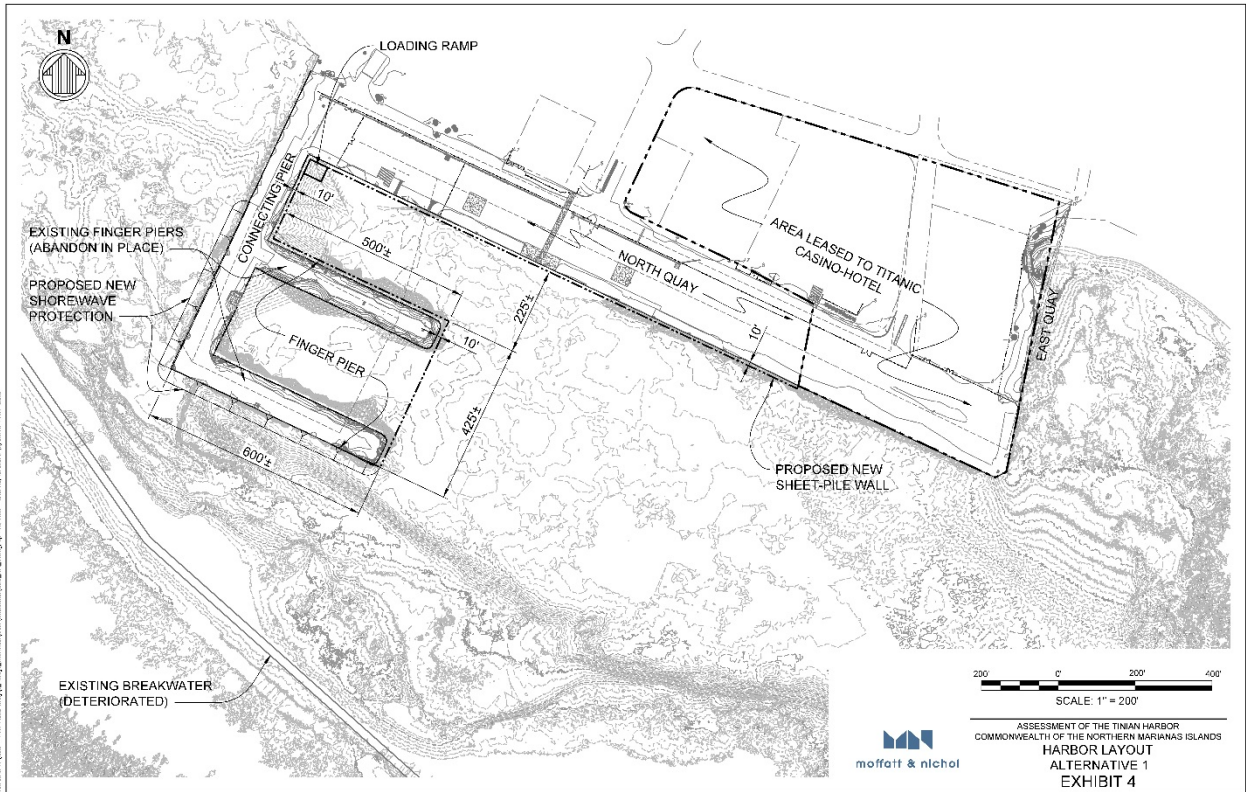


Figure 6-1: Harbor Layout Alternative 1

Advantages of this Alternative are:

1. 425-ft wide pier-backland space
2. Least dredging volume
3. End of pier can berth up to 320 feet long vessels

Disadvantages of this Alternative are:

1. Narrow (225-ft wide) basin between the new Finger Pier and the North Quay. This basin is anticipated to be the best protected area in the harbor. This narrow basin limits size and number of vessels that can berth in this basin
2. Not adequate for berthing vessel longer than 440 feet along the north face of the new Finger Pier
3. Back land space may be too wide for the expected use

Potential berthing arrangement to accommodate several different types of vessels simultaneously are provided in Appendix A, Exhibits 5 and 6.

### 6.3. Alternative 2 – 500-ft Long x 300-ft Wide Finger Pier

This alternative involves widening the existing Outer Finger Pier to 300 feet and demolishing the existing Center Finger Pier resulting in a 500-ft long by 300-ft wide pier with a total of 800 linear feet of berthing face. An unloading ramp is provided at the junction between the North Quay and the connecting pier (See Figure 6-2).

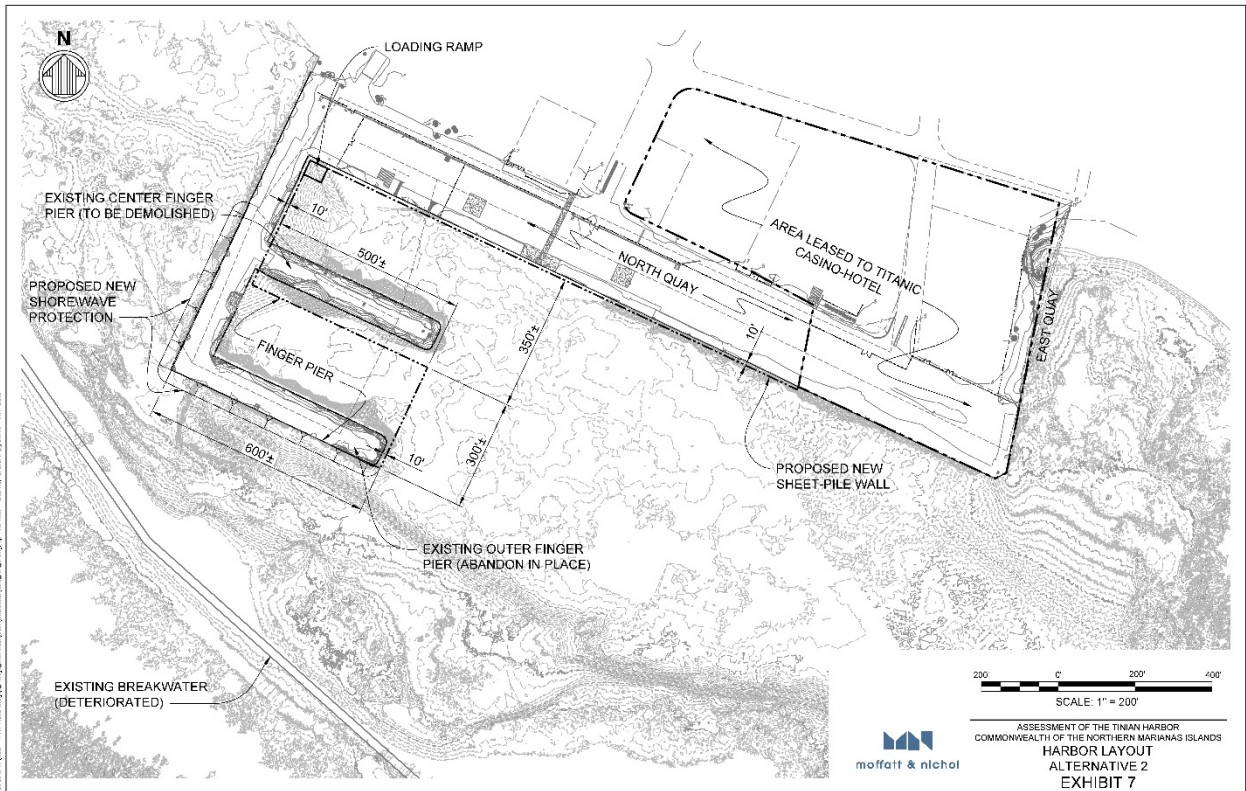


Figure 6-2: Harbor Layout Alternative 2

Advantages of this Alternative are:

1. Wide (350 feet) basin between the new Finger Pier and the North Quay. This resized basin is anticipated to be the best protected area in the harbor. This wide basin will provide flexibility that allows a wide range and maximum number of vessels to be berthed and travel in this basin
2. Adequate pier-backland space (300 feet wide) for expected operations
3. Material from demolition of the existing Center Finger Pier can be used as backfill to construct the new Finger Pier

Disadvantages of this Alternative:

1. Require demolition and dredging of existing Center Finger Pier
2. Not adequate for berthing vessel longer than 440 feet along the north face of the finger pier
3. End of finger pier can berth up to approximately 200 feet long vessels

Potential berthing arrangement to accommodate several different types of vessels simultaneously are provided in Appendix A, Exhibits 8 and 9.



## 6.4. Alternative 3 – 700-ft Long x 300-ft Wide Finger Pier

This alternative involves widening the existing Outer Finger Pier to 300 feet, extending the pier to 700 feet long and demolishing the existing Center Finger Pier resulting in a 700-ft long by 300-ft wide pier with a total of 1000 linear feet of berthing face. An unloading ramp is provided at the junction between the North Quay and the connecting pier (See Figure 6-3).

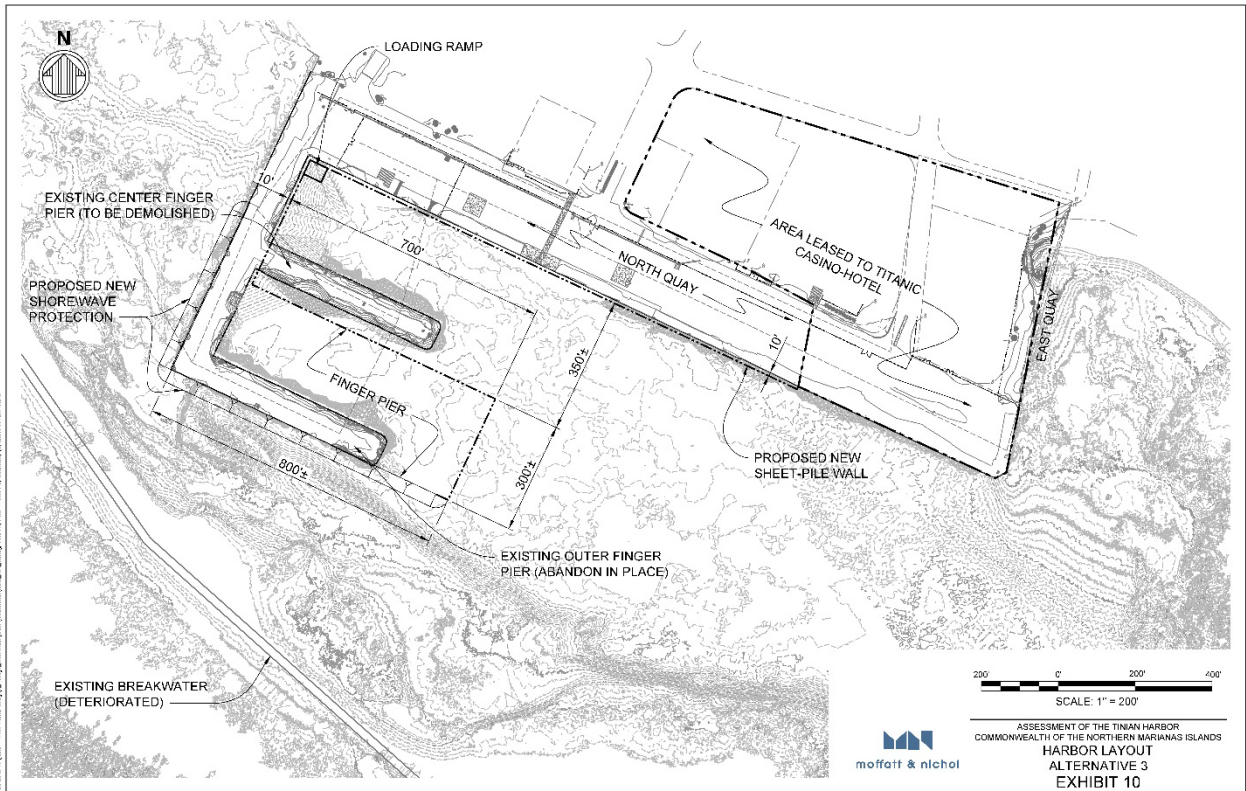


Figure 6-3: Harbor Layout Alternative 3

Advantages of this Alternative are:

1. Wide (350 feet) basin between the new Finger Pier and the North Quay. This resized basin is anticipated to be the best protected area in the harbor. This wide basin will provide flexibility that allows a wide range and maximum number of vessels to be berthed and travel in this basin
2. Adequate for berthing vessel longer than 550 feet along the north face of the pier
3. Adequate pier-backland space (300 feet wide) for expected operations
4. Material from demolition of the existing Center Finger Pier can be used as backfill to construct the new Finger Pier

Disadvantages of this Alternative:

1. Require demolition and dredging of existing Center Finger Pier
2. End of pier can only berth up to approximately 200 feet long vessels

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Potential berthing arrangement to accommodate several different types of vessels simultaneously, are provided in Appendix A, Exhibits 11 and 12.

Alternative 3 offers the greatest operational flexibility when compared to the other alternatives. This study identifies the alternative as the most desirable. The Tinian Delegation also expressed preference toward this alternative. This study recommends Alternative 3 for further development.

## 7.0 Modernized Harbor Structural Alternatives

Based on information collected from the Paragraph 3.1 Above and under water inspection, the Connecting Pier (except the Northwest portion), Center Finger Pier, Outer Finger Pier and the Berth 4 in the North Quay and the East Quay require major renovation or complete replacement. Majority portion of the Berth 4 in the North Quay and the East Quay (collectively called East Quay by CPA in the lease agreement) has been leased to developer for construction of the Titanic Casino-Hotel complex. Renovation or replacement of the leased portion of Berth 4 and the East Quay are not covered in this study. Results from Paragraph 3.2 Structural Evaluation of Existing Wharf Structures also indicate that North Quay, Berths 1, 2 and 3 would require major renovation or complete replacement if wharf operations are to be expanded from the current situation (with both load and water depth restrictions) and further deterioration of the bulkhead system to the point that the quay becomes unusable or unsafe or CPA's desires to upgrade the bulkhead to meet the current seismic design criteria. Following are structural options to modernize (to renovate or replace) the existing bulkhead wall (steel sheet pile quay wall) in Tinian Inner Harbor. Both new mooring system and new fender system will be installed where applicable along with the new bulkhead wall construction.

### 7.1. Structural Options

#### 7.1.1. Bulkhead Replacement Option

Given the severity of the deterioration of the SSP bulkhead structures throughout most of the facility, repair is not considered to be a feasible or practical. Instead, complete replacement of the bulkhead structures is recommended.

This type of repair typically involves the installation of a new steel sheet pile bulkhead set outboard of the existing structure by the minimum distance necessary to allow construction of the new bulkhead wall. The new bulkhead is fitted with a new anchor system (tie-rods and anchor walls or deadman anchors) and reinforced concrete cap beam. The space between the existing and new wall is filled with Control Density Fill (CDF – soil with low cement content), or a similar type of material. The existing structure is abandoned in place and buried behind the new bulkhead (See Appendix A, Exhibit 21).

With this repair option, the new bulkhead can be designed to accommodate larger loads than the original facility was designed for. In the case of the proposed facility improvements at Tinian, the bulkhead shall be designed based on dredge depth of -28 ft MLLW, plus overdredge allowance and structural design criteria for new and replaced piers and quay walls provided in Section 4.3.

The conceptual design of the bulkhead replacement results in the following parameters:

1. Sheet Pile Section = AZ 26 - 700 with a minimum yield of 50 ksi.
2. Sheet pile tip elevation = -50 ft
3. The tie-rod size and spacing = 1-3/4" dia. tie rod with a minimum yield of 75 ksi at 8 ft oc, set at EL +2 ft MLLW.

4. Tie back anchorage set a distance of 60 ft behind the new bulkhead. The anchorage structure may be a reinforced concrete deadman anchor or a driven steel sheet pile anchor wall or concrete cap on piling.
5. Installation of corrosion protection features will mitigate the corrosion deterioration over the service life of the structure.

### 7.1.2. Caisson Option

As an alternative to installing a new steel sheet pile bulkhead, reinforced concrete caissons may prove to be a practical alternative where suitable foundation materials exist. Caissons are designed as watertight cellular concrete structures suitable for transit on the open sea. Caisson interiors are subdivided into watertight compartments to assure stability afloat during transit and storage.

After the foundation is prepared, caissons are floated into position and seated with water ballast. Permanent ballast consisting of solid granular materials that can be distributed within cells and removed from cells by mechanical means is added. The caisson berth acts as a gravity-type retaining structure to resist lateral earth pressures and seismic loads.

Caisson structures present many benefits over other types of waterfront structures:

1. Off-site fabrication benefits overall construction schedule
2. Modular construction accommodates construction phasing plans
3. Adapts easily to heavy upland surcharge conditions, if needed
4. Long service life, low maintenance requirements

The conceptual design of a caisson berth results in a caisson structure approximately 45 ft wide. The length of the caissons is dependent on the dimensions of the fabrication facility and suitable floating stability, but typical caisson lengths are on the order of 2.5 to 3.5 times its width. The caissons are installed adjacent to each other, with concrete closure keys, as required to make up the length of the new berth.

### 7.1.3. Protection Rock Revetment Option

The wind and wave exposure on the outer perimeter of the Connecting Pier and the Outer Finger Pier may be excessive due to the deteriorated condition of the breakwater. These conditions together with the shallow water prevent mooring the types of vessels identified in Paragraph 4.2.7 and carrying out loading operations at the future facility.

If berthing in these areas is not required, then it may be feasible to install a protection rock revetment against the existing sheet pile bulkhead as a means of shoring up the deteriorated structure and minimizing stresses on the sheet pile bulkhead. The design of the protection rock revetment would include suitable filter rock core material against the existing bulkhead that will prevent fines from migrating out from behind the wall and causing sinkholes and settlement, as well as larger protection rock to ensure stability of the revetment against the wave environment. A concrete retaining wall will be constructed above or adjacent to the existing sheet pile to retain the soil (similar to the current North Quay – Berth 4, see Figure 3-5). The stone revetment will overlap this concrete element to protect the existing steel sheet pile under the concrete.

## 7.2. Structural Alternative for Tinian Harbor Facilities

This Section itemizes the different alternatives to modernize the facilities within Tinian Inner Harbor. The alternatives are summarized in Figure 7-1. Plan and sections are provided Appendix A, Exhibits 18 thru 25.

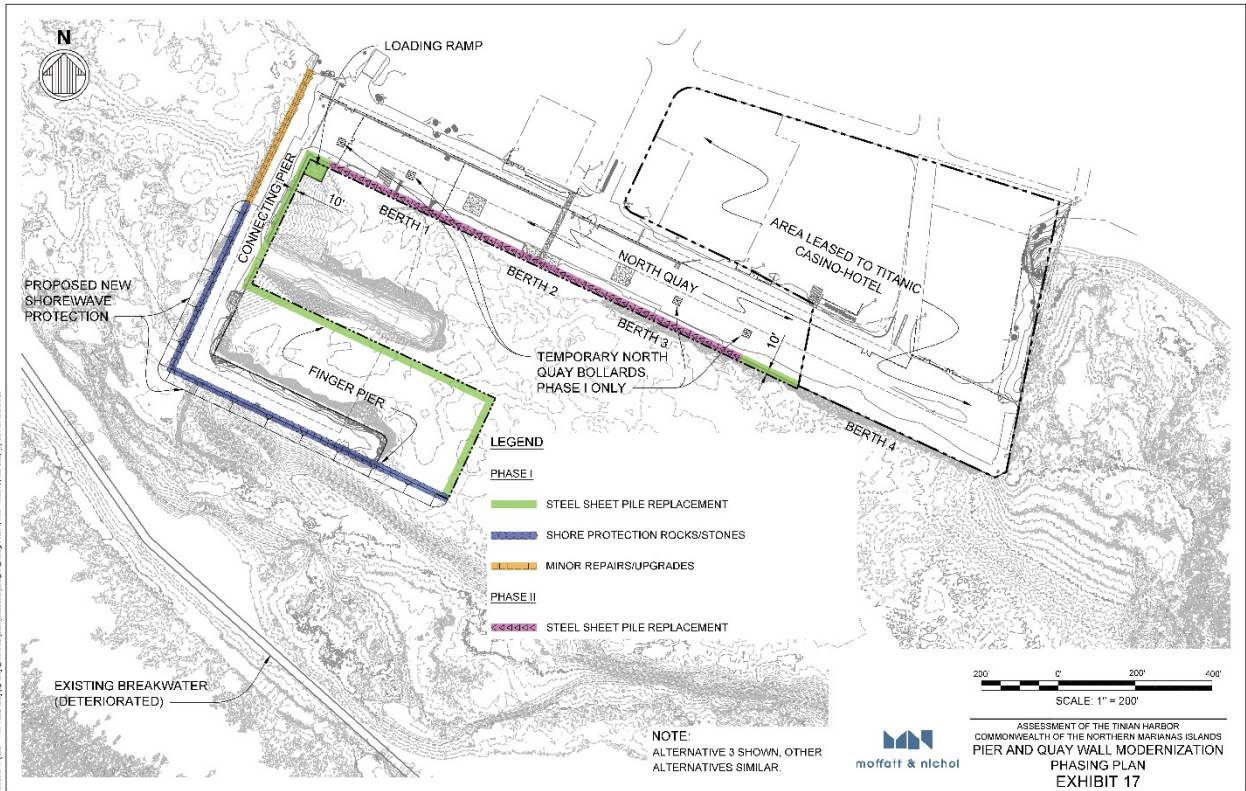


Figure 7-1: Pier and Quay Wall Modernization Plan

### 7.2.1. North Quay – Berths 1, 2 and 3

- Short Term – Maintain current operations with load restrictions and draft constraints. It should be recognized that the existing waterfront facilities do not meet current seismic code requirements. In addition, conditions of the existing tie-back system are unknown and shall be verified by excavating the site to expose some tie-rods and anchors for visual inspection.
  - No dredging near the berths
  - Repair concrete cap beams
  - Upgrade bollards system if berthing of large vessels at Berths 1 and 3 are required (See Appendix A, Exhibit 23)
  - Upgrade fenders system if berthing of large vessels at Berths 1 and 3 are required (See Appendix A, Exhibit 23)
  - Install new AC Pavement for Berth 1 and 3
  - Install new sacrificial cathodic protection system for existing steel sheet piles to extend service life

- Maintain existing operational load restriction of 250 psf placed at least 20 ft from the face of the quay wall
- Long Term – Upgrade to accommodate increased live loads, increased draft requirements and to meet current seismic code requirements
  - Replace existing steel sheet pile wall with new steel sheet pile wall (see Paragraph 7.1.1 and Appendix A, Exhibit 21)
  - Construct new concrete pile cap beam
  - Construct new bollard system to accommodate all design vessels
  - Construct new fender system to accommodate all design vessels
  - Dredge to required water depth near the berths
  - Install new AC pavement
  - Install corrosion protection for new sheet pile and appurtenances

#### **7.2.2. North Quay – Berth 4**

- Upgrade portion of Berth 4 outside of the leased area to accommodate increased live loads (600 psf), increased draft requirements and to meet current seismic code requirements.
  - Replace existing steel sheet pile wall with new steel sheet pile wall (see Paragraph 7.1.1 and Appendix A, Exhibit 21)
  - Construct new concrete pile cap beam
  - Construct new bollard system if needed
  - Construct new fender system if needed
  - Dredge to required water depth near the berths if needed
  - Install new AC pavement
  - Install corrosion protection for new sheet pile and appurtenances

#### **7.2.3. Connecting Pier – Northwest Portion**

- Maintain current operations with small craft berthing and live load restrictions. It should be recognized that the existing steel sheet pile wall at this location may not meet current seismic code requirements. Failure of this wall after a major seismic event may render this portion of the Connecting Pier unusable. However, as long as the new wall along the east side of the Connecting Pier is designed to meet the current seismic code requirements (see Paragraph 7.2.4), access to the new Finger Pier is anticipated to be maintained after a seismic event.
  - No dredging
  - Repair concrete cap beams if needed
  - Install AC Pavement
  - Install sacrificial cathodic protection system for existing sheet piles to extend service life
  - May not meet current seismic requirements

#### **7.2.4. Connecting Pier (other than Northwest portion)**

- East face

- Replace existing steel sheet pile wall with new steel sheet pile wall (see Paragraph 7.1.1 and Appendix A, Exhibit 21)
- Construct new concrete cap beam
- Construct new bollard system if needed
- Construct new fender system if needed
- Construct new unloading ramp
- New AC pavement
- Install corrosion protection for new sheet pile and appurtenances
- Dredge to required water depth
- West and Southwest face
  - Install wave protection rock revetment (see Paragraph 7.1.3) or replace existing steel sheet pile wall with new steel sheet pile wall (similar to Paragraph 7.1.1) and new concrete cap beam (See Appendix A, Exhibit 25).
  - Install new AC pavement

#### 7.2.5. Finger Piers

- North and East faces
  - Replace existing steel sheet pile wall with new steel sheet pile wall and construct new concrete cap beam (see Paragraph 7.1.1 and Appendix A, Exhibits 21 and 22), or replace existing steel sheet pile wall with concrete caissons (see Paragraph 7.1.2)
  - Construct new bollard system
  - Construct new fender system
  - New AC pavement
  - Install corrosion protection for new sheet pile and appurtenances
  - Dredge to required water depth
- South Face
  - Install wave protection rock revetment (see Paragraph 7.1.3 and Appendix A, Exhibit 24) or replace existing steel sheet pile wall with new steel sheet pile wall (similar to Paragraph 7.1.1) and new concrete cap beam.
  - Install new AC pavement

## 8.0 Environmental and Permitting

### 8.1. Background and Setting

#### 8.1.1. Coastal Region and Processes

The majority of Tinian's shoreline consists of low to high limestone cliffs with sea-level caverns, cuts, notches and or slumped boulders, commonly bordered by intertidal benches (Eldredge 1983, U.S. Department of the Navy [Navy] 2005).

The Tinian coastline is similar to that of the other CNMI shorelines, generally including rocky intertidal areas, steep cliffs and headlands, and the occasional beach or mudflat. Water erosion of rocky coastlines has produced wave-cut cliffs, and sea-level benches (volcanic and limestone) and wave-cut notches at the base of the cliffs. Large blocks and boulders often buttress the foot of these steep cliffs and wave-cut terraces occur seaward of the cliffs (Navy 2005). Beach deposits consist mainly of medium to coarse grain calcareous sands, gravel and rubble interspersed amongst exposed limestone rock (Navy 2005).

#### 8.1.2. Terrestrial and Marine Aquatic Habitat and Wildlife

There are a number of caves and limestone cliffs on Tinian, with only about 5% of the native forest remaining after agricultural deforestation and development prior to World War II (WWII) and the following military activities during that war (Camp et al. 2012). One of the unique upland species of the island is the Tinian Monarch (*Monarcha takatsukasae*), a small forest bird found only on Tinian. It is currently a protected species under the Endangered Species Act (ESA).

Thirteen beach districts have been identified on Tinian (Pultz et al. 1999), 10 at west coast locations and three (one distinct and two discontinuous beach complexes) along the east coast. All beaches reportedly support turtle nesting activities (Wiles et al. 1989, Pultz et al. 1999).

Marine flora in and around Tinian Harbor include macroalgae, sea grasses, and emergent vegetation. Invertebrates may include gastropods (snails), cephalopods (squid and octopus), crustaceans (crabs and lobster), sponges, and coral.

The north, east, and south coasts of Tinian have very limited fringing or apron reef development, most noticeable at Unai Dankulo. Reef composed of live corals is more prevalent at west coast locations, with fringing coral reef habitats present inside Lamanibot Bay and a patch and small barrier reef system (altered as a breakwater for the harbor) located within Tinian Harbor (Eldredge 1983, Navy 2005). Coral reef habitat totals approximately 19 sq. mi between the coastline and the 100-mm isobath (Brainard et al. 2008).

Benthic survey data from the CNMI Marine Monitoring Team (MMT) (2008) and the National Oceanic and Atmospheric Administration (NOAA) Coral Reef Ecosystem Division (CRED) (Brainard et al. 2008) show that about 15 coral genera have been reported within the Tinian Inner Harbor; and a single species (*Leptastrea purpurea*), accounted for 60% of the observed colonies and, along with *Pocillopora damicornis*, represented 72% of all observed colonies. There were 27 coral genera reported from the Outer Harbor reefs, including the ocean side of the breakwater. While coral diversity was comparable to reef slope sites surveyed on the northern beaches, the coral density was lower. The coral community was not dominated by any single taxonomic group, however, *Goniastrea retiformis* accounted for 24% of all observed colonies. Coral colonies



>16 inches (in) accounted for 9% of the observed colonies. In contrast, coral colonies in the Inner Harbor were heavily skewed toward small size classes, with 62% of colonies <0.78 in and 81% of all observed colonies being <2 in.

Tinian also possesses seagrass beds along the northwestern, the northeastern, the southwestern, and the central eastern coastlines (Navy 2003). They provide suitable nursery habitat for commercially important species, such as crustaceans, fish, and shellfish, and are a food source for protected species like sea turtles (Heck et al. 2003). Seagrasses also contribute a high level of primary production to the marine environment, which supports high species diversity and biomass (Spalding et al. 2003). The distribution of soft and hard bottom habitats, as derived by satellite imagery by NOAA, is shown in Figure 8-1.

### 8.1.3. Protected Species

Protected species around Tinian reported in the most recent Integrated Natural Resource Management Plan (Navy 2013) include: 46 birds (most migratory); one bat (Mariana fruit bat [*Pteropus mariannus*]); seven reptile species, two sea turtles, three geckos; two skinks; and two land crustaceans. The Mariana common moorhen (*Gallinula chloropus guami*) is reported from the area as well (Amidon 2009). Spinner dolphins (*Stenella longirostris*) are observed frequently off Tinian. Figure 8-2 shows the distribution of key species overlapped with important nearshore habitat.

The Inner Tinian Harbor had a rich fish community; 101 fish taxa in 28 families have been observed in recent surveys (Brainard et al. 2008). Damselfish and wrasses were numerically dominant, accounting for over 64% of all observed individuals. While parrotfish were less dominant numerically, they were the primary contributor to biomass, accounting for 32% of the fish biomass at Inner Harbor sites, over twice that attributable to any other fish family. Parrotfish and mullets were numerically the most commonly observed large fish in the Inner Harbor, but densities of large fish were lower at Inner Harbor than at Outer Harbor sites.

One hundred and twenty-eight fish species in 26 genera were found in the Outer Harbor. Three families, wrasses (26% of individuals), damselfish (26% of individuals), and surgeonfish (22% of individuals) accounted for the 74% of the fish observed in the Outer Harbor. These same families also contributed 64% to the overall fish biomass. Large fish were relatively rare; the most common fish (8 in in length) were parrotfish. However, large emperors and triggerfish were dominant in terms of biomass. No sharks or rays were observed at Tinian Harbor. The Napoleon wrasse (*Cheilinus undulatus*) (designated a National Marine Fisheries service [NMFS] Species of Concern [SOC] and Coral Reef Ecosystem Management Unit Species [CREMUS]) and bumphead parrotfish (*Bolbometopon muricatum*) (designated a NMFS candidate species and CREMUS) were not observed in Tinian Harbor.

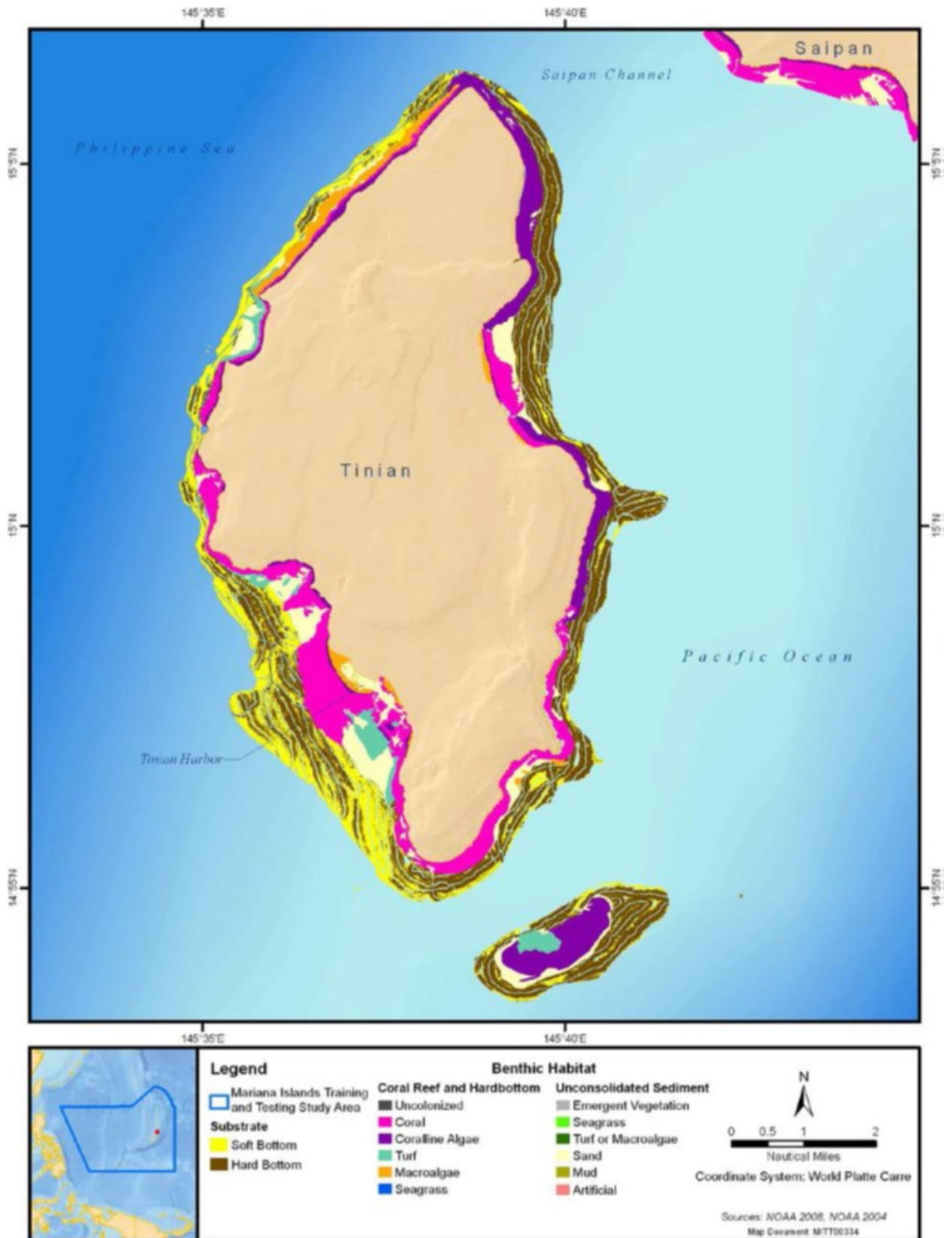


Figure 8-1: Distribution of Soft and Hard Bottom Nearshore Habitat at Tinian (NOAA 2008)

#### **8.1.4. Marine Protected Area**

The Division of Fish and Wildlife (DFW) is CNMI's lead agency in charge of designating and overseeing marine managed areas. While Tinian does not have a designated Marine Protected Area (MPA), it does have a limited take zone proposed for its coastal waters. The Tinian Fish Reserve, proposed in 2003 under the CNMI House Bill #13-110, is still under debate.

#### **8.1.5. Marine Cultural and Historic Resources**

Vessels have wrecked upon the shores of the Mariana Islands since Spanish galleons sailed to them in the seventeenth century. There are also abundant WWII-era remains (including sunken ships, airplanes, and tanks) along the shores of the Islands, including Tinian (CNMI 2001).

Tinian's cultural resources include pre-contact Chamorro sites and many WWII era sites and artifacts associated with development by the Japanese and U.S. The House of Taga, with the largest erected latte stones in the Marianas, is in a park setting near Tinian Harbor (Navy 2010).

An architectural survey and archival study has been conducted for Tinian Harbor. Over 340 cultural resources associated with Tinian are considered eligible for or listed in the National Register of Historic Places (NRHP) including one National Historic Landmark (NHL), one individually listed resource (the Unai Dankulo Petroglyph site), 90 pre-contact sites, and 257 historic archaeological sites (Navy 2010). A total of 13 possible traditional cultural properties have also been identified, all are archaeological sites; nine are associated with the Chamorro and four are associated with the Japanese (Griffin et al. 2010).

After the capture of Tinian from the Japanese in early August 1944, the U.S. developed nearly the entire island into an air base. However, the island lacked a harbor for cargo vessels. Between November 1944 and March 1945, Tinian Harbor was constructed. Tinian Harbor is eligible for inclusion on the NRHP (Thursby 2008). The harbor is eligible under Criterion A for the role it played in development of the B-29 air base for the atomic bombing mission near the end of WWII, and Criterion C for the design and construction methods of the Navy Seabees during WWII (Thursby 2008).

At least 19 submerged historic resources are located around Tinian (Carrell et al. 1991). However, only the locations of nine known wrecks, obstructions, or occurrences have been determined, including the "Mitakesan Maru" and the "Seizan Maru".

### **8.2. Environmental Conditions and Permitting**

Based on a literature review of existing information and previous permit applications, the consultant team identified environmentally sensitive areas within and near Tinian Harbor. The team also developed an outline program for obtaining necessary regulatory approvals for Tinian Harbor redevelopment. It is important to understand that the sub-littoral zone can be a rapidly changing environment and that most of the available survey information is based on aerial or satellite data. Therefore, field verification of local conditions will be necessary for design and permitting of any project at the Harbor.

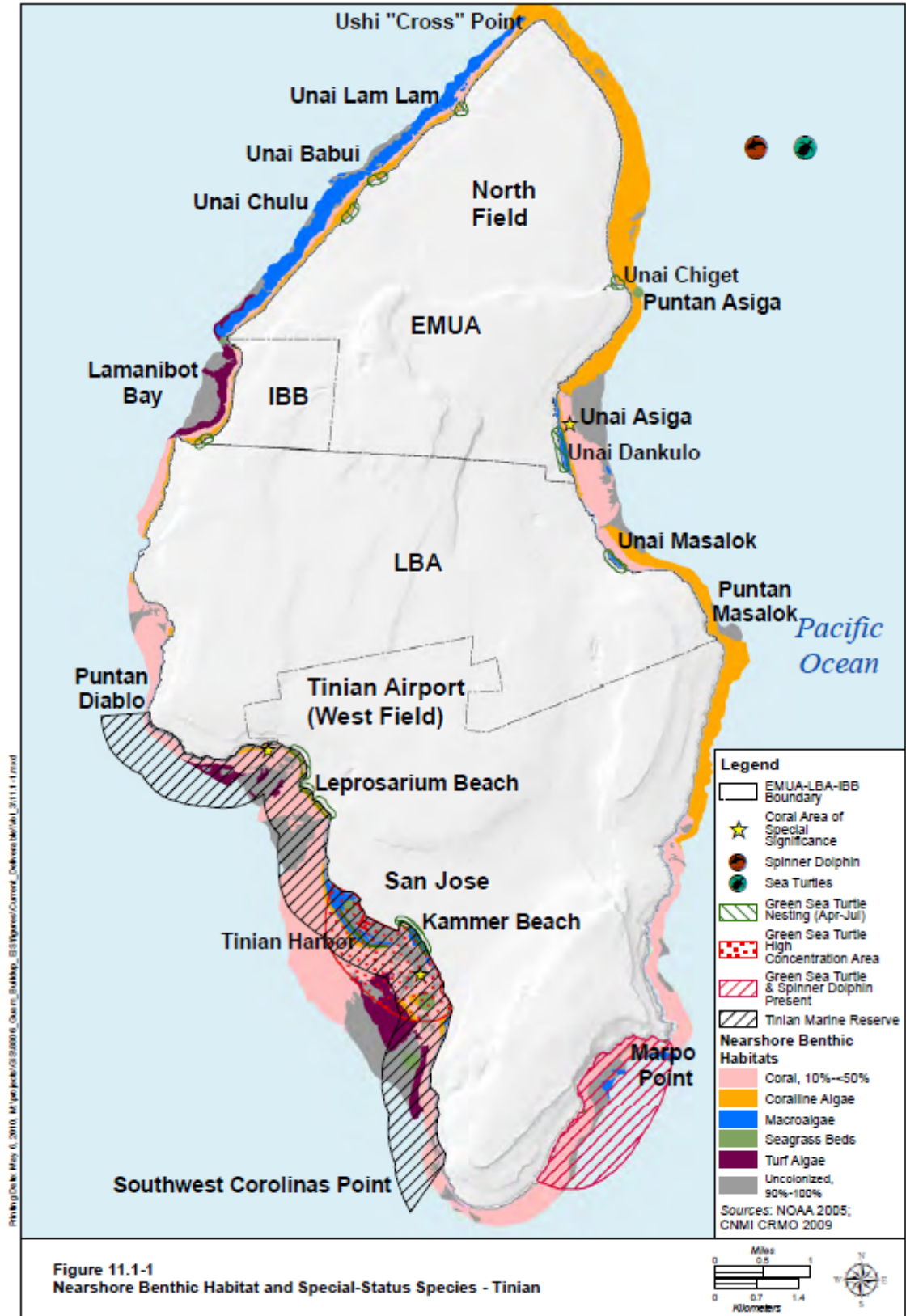


Figure 8-2: Distribution of Nearshore Habitat and Key Species at Tinian (NOAA 2005, CNMI CRMO 2009)

### 8.2.1. Construction Related Impacts

The following types of construction activities are proposed to modernize Tinian Harbor for the current vessel fleet. Overall, the harbor layout and footprint will remain unchanged. The following project construction activities may result in both temporary and long-term impacts on existing environmental, historical and cultural, transportation, recreation and socioeconomic resources:

- Deepening (dredging) of the harbor to provide adequate channel access and navigability for design vessels;
- Possible upland disposal for dredge material;
- Modification (repair) or demolition and replacement of the main North Quay wall and two existing finger piers;
- Upland excavation and fill activities to improve existing utilities to North Quay wall and finger piers.
- In-water fill for North Quay wall and pier fingers.

These activities could impact the resources discussed below.

#### Upland and Marine Cultural Resources

The latest NRHP has been consulted to determine whether there are known historic or prehistoric sites in the vicinity of the Tinian Harbor.

#### Biological Environment

A literature review shows that Tinian hosts several rare upland and marine plant and animal species including the Mariana fruit bat (*Pteropus mariannus*), the Mariana common moorhen (*Gallinula chloropus guami*), the green sea turtle (*Chelonia mydas*), and the hawksbill turtle (*Eretmochelys imbricata*). Both of the turtle species are listed as endangered under the ESA. A number of whales and dolphins are federally listed and known to occur off CNMI as well.

Most of the identified plants and animals are not anticipated within the immediate redevelopment footprint of the Tinian Harbor. Nesting beaches for Green sea turtles will not be modified or developed as part of the project and mitigation measures can be incorporated during construction to minimize the risk of vessel hits on swimming turtles. The most likely impacts will be to near shore coral colonies. These areas will have to be surveyed prior to permitting and a plan developed for minimizing or mitigating any potential impacts.

### 8.2.2. Regulatory Requirements

Modernization of Tinian Harbor will require both U.S. federal regulatory permits and local Bureau of Environmental and Coastal Quality (BECQ) approval prior to detailed design or construction. Regulations require avoidance of impacts to sensitive biological and historical or cultural resources in the area.

## National Environmental Policy Act

The National Environmental Policy Act (NEPA) of 1969 was established to ensure that environmental consequences of federal actions are incorporated into an agency's decision making processes. Any project completed by a federal agency, using federal funding, or requiring a federal permit must comply with NEPA.

A federal categorical exemption (CATEX) or Environmental Assessment (EA) will, at a minimum, be required for this project. Given the scope of the proposed project, an Environmental Impact Statement (EIS) may also be likely, which would compare selected project alternatives and consider cumulative impacts on the physical environment, biological environment and human environment.

To support the NEPA process, the following studies are anticipated:

- Biological field surveys and investigations of marine benthic and reef habitat within and around the project area. Biological investigations could also include assessments of sensitive upland habitat (i.e. any nearby streams, wetlands, protected upland vegetation, etc.) where shoreline fill, dredge material disposal, or upland utility improvement work is proposed.
- In-water historical and cultural survey in the Harbor to evaluate the potential for historical remnants on the seafloor.

A preferred alternative will be selected at the conclusion of the NEPA process.

## Rivers and Harbors Act

The Rivers and Harbor Act Section 10 regulates the placement of structures in "navigable waters" where these would be limited to the coastal lagoon and ocean waters out to three nautical miles. Specific examples of structures include: dock or pier pilings, wharfs, breakwaters, bulkheads, jetties, pipelines, weirs, transmission lines, anchoring or mooring buoys, and floating platforms. The USACE administers the Rivers and Harbors Act under Section 10. A USACE Permit under Section 10 is considered relatively straight forward and usually does not involve compensatory mitigation.

## Clean Water Act

The Clean Water Act (CWA) regulates virtually all physical alterations and discharges into "waters of the U.S.," including all territorial seas three nautical miles seaward from the mean high water mark and any waterways that physically connect to the ocean and any other wetlands. The CWA covers several water associated issues including:

- Section 401 Water Quality Certification (WQC) provides states with ways to regulate surface water quality. The CNMI BECQ administers the state certification program for Federal water-related permits including the Section 401 WQC. The modernization and rehabilitation of Tinian Harbor could trigger the requirement to apply for and obtain a WQC from BECQ for construction.
- Section 402 National Pollution Discharge Elimination System (NPDES) regulates the discharge of pollutants into waters of the US. Redevelopment of Tinian Harbor uplands (to replace pavement as utilities are improved) could require an individual Section 402 NPDES permit for any discharge into

nearshore marine waters. The US Environmental Protection Agency (USEPA) has authority over the CWA Section 402 NPDES regulatory program and coordinates closely with the CNMI BECQ. Permit applications can be submitted to the USEPA Region 9, San Francisco office. However, the CNMI BECQ may administer this permit locally.

- Section 404 of the CWA specifically regulates the discharge of fill materials into “waters of the US”, which includes the territorial seas three nautical miles seaward from the mean high water mark. Redevelopment of the Tinian Harbor (to fill in shoreline areas behind walls) would require a Section 404 permit. The Section 404 process requires a determination as to whether there are practical alternatives having less impact. The CWA Section 404 regulatory program is administered by the USACE with oversight and guidance from the USEPA. Although the CNMI is under the administrative authority of the USACE Honolulu District, the point of contact for all CNMI Section 10 and 404 regulatory issues in the USACE Guam Regulatory Office.

### **National Historic Preservation Act**

Section 106 of the National Historic Preservation Act (NHPA) requires that federally assisted or permitted projects account for the potential effects on sites, districts, buildings, structures, or objects that are included in or eligible for inclusion in the National Register of Historic Places. Section 106 review is conducted by the local CNMI Historical Preservation Officer and results in a “Determination of Effect” document. Redevelopment of the Tinian Harbor would trigger Section 106 review. It is recommended that Section 106 review be initiated early in the permit process to avoid delays in publishing a Determination of Effect.

### **Endangered Species Act**

The Endangered Species Act (ESA) has the purpose to conserve “the ecosystems upon which endangered and threatened species depend” and to conserve and recover species listed as Endangered or Threatened. In the marine environment, enforcement of the ESA is the responsibility of the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS). NMFS/USFWS provide input and guidance to the USACE as part of the permit process. They can also provide input and guidance at the NEPA level to lead agencies. The Tinian Harbor Redevelopment Project will most likely require the completion of habitat assessments as the site contains habitat that could be used by ESA-listed species. If an endangered species or its habitat occurs on the project site, the NMFS/USFWS must issue a Biological Opinion (BiOp) prior to the USACE issuing a permit.

### **Marine Mammal Protection Act**

The Marine Mammal Protection Act (MMPA) of 1972 prohibits the take or harassment of any marine mammals (not just protected species). Harassment can include exposure to reduced water quality or in-air and in-water noise from pile driving and dredging operations, as well as injuries or deaths from vessel strikes. NMFS provides input and guidance to USACE as part of the USACE permit process.

### **Coastal Zone Management Act**

Under the Coastal Zone Management Act (CZMA), any federal agency conducting or supporting activities directly affecting the coastal zone must demonstrate the activity is, and will proceed in a manner, consistent with approved State’s Coastal Zone Management Program. Responsibilities over various aspects of the CNMI’s

coastal marine resources are shared between the Coastal Resources Management Office (CRMO), the DFW, and the BECQ. The redevelopment at Tinian Harbor meets a number of the above triggers and will require a permit through CRMO.

### Other Regulations under the BECQ

The BECQ is an agency under the Governor that was established by the Commonwealth Protection Act to “develop and administer programs... 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.” To protect the ground water the BECQ regulates the permitting of individual waste water disposal systems (IWDS), well drilling and well operations, and above- and below-ground fuel storage tanks. In addition, their non-point source pollution program requires Earth Moving and Erosion Control Permits for all mechanized earth moving activities.

- Water Quality Standards Regulations authorizes the CNMI to approve, condition, or deny water-related permits issued including the USACE Section 404 permit, the USACE Section 10 permit, and the USEPA Section 402 NPDES permit.
- Earth Moving and Erosion Control Regulations require an Earth Moving and Erosion Control Permit by written clearance from the Historic Preservation Officer and the DFW.
- Individual Wastewater Disposal System (IWDS) Rules and Regulations govern the design of wastewater treatment and disposal systems including septic tanks and leaching fields or other treatment facilities.

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## 9.0 Project Phases and Construction Sequence/Schedule

The Tinian Inner Harbor facilities are in varied states of being functional, as described throughout this report. The conditions range from presently usable to dilapidate. Consequently, there is an opportunity to phase the overall harbor improvement work and defer maintenance, upgrade and replacement on those elements that remain functional in the near to medium term. Phasing the work may also be necessary based on capital funding availability.

Based on the results of the field investigation and assessment performed in this study, the overall inner harbor improvement project is expected to be constructed in a minimum of two (2) distinct phases, as shown on *Figure 9-1* and described as follows:

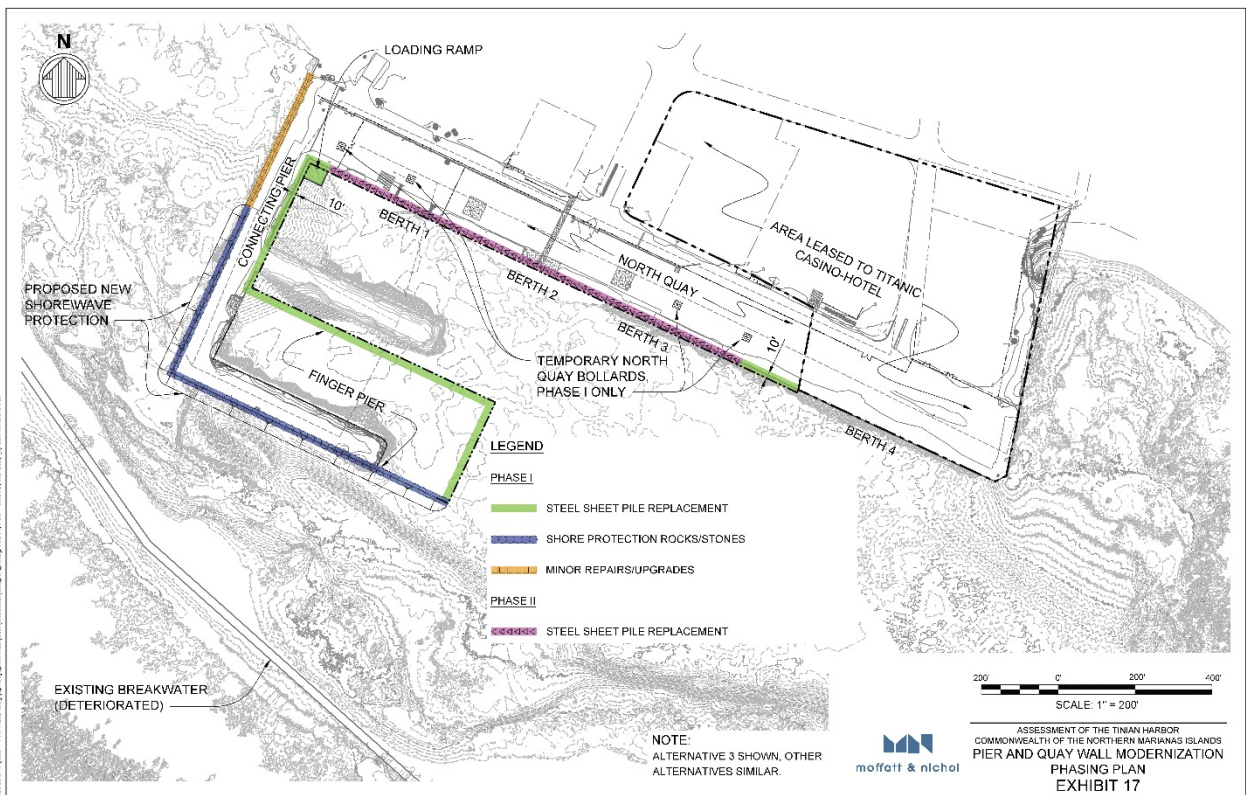


Figure 9-1 Pier and Quay Wall Modernization Plan Alternative 3

### Phase 1:

- This phase generally represents the structural modernization of the Connecting Pier, the Finger Piers, the western portion of Berth 4 outside of the leased area, as well as the navigational improvements to the harbor.
- To meet the navigational needs of the modern fleet of vessels expected to call on the Tinian Harbor, the full scope of dredging work in the approach channel and the turning basin is recommended to be completed. It is anticipated that UXO surveying, monitoring, recovery and disposal, and environmental BMPs will be necessary during this phase of the work.

- Portion of the Connecting Pier, the Outer and Center Finger Piers, and the Berth 4 bulkhead are no longer in a serviceable condition and need to be reconfigured and replaced. As described previously in this report, the modernization of the Finger Piers will include construction of a single widened pier to provide sufficient room for movement of pier side vehicles, cargo and passengers effectively and safely, especially when multiple sides of the modernized pier are occupied by vessels. The recommended repair is the installation of a new tied-back steel sheet pile to form the new Finger Pier. The new Finger Pier will be formed by a combination of bulkheads installed outboard of existing bulkheads that will be buried in place, and traditional backfilled bulkheads.
- The north and east faces of the new Finger Pier are to be enclosed by new tied-back steel sheet pile bulkhead. The existing west side of the Connecting Pier forms the west face of the new Finger Pier and the existing south side of the Outer Finger Pier forms the south face of the new Finger Pier. Area within the new Finger Pier footprint is filled with combination of suitable dredge material and imported fill material. Remnants of existing dilapidated sheet pile system within the new Finger Pier footprint are to be left buried in-place.
- The west side of the existing Connecting Pier and the south side of the existing Outer Finger Pier (west and south sides of the new Finger Pier) have been exposed to high wind and wave effects, as a result of the extensive damage to the existing harbor breakwater. Furthermore, these areas have limited water depths and are not considered as future berthing areas for harbor operations. In addition, breakwater repairs or upgrades are outside of the scope of this project, and the timing of repairs or upgrades of the breakwater are not known. This study recommends installation of engineered coastal protection along the west and south faces of the new Finger Pier. The protection rock and stone will bury the existing dilapidated steel sheet pile bulkheads in place, negating the need for costly strengthening and upgrades of the bulkhead in this area.
- To allow loading and unloading of cargos or small vehicles via the bow ramp on certain vessels, installation of a ramp is recommended at the junction between the North Quay and the Connecting Pier.
- To improve near term operational requirements on the North Quay, completion of concrete repairs on the bulkhead cap beam are included, as well as installation of berthing fenders and mooring hardware on Berths 1 and 3 (Berth 2 was recently upgraded by Mobil). Due to limitations on the structural capacity of the exiting sheet pile system, load restriction on the North Quay shall be exercised.
- Heavy duty asphalt pavements with a structural base is to be installed at the new Finger Pier and Connecting Pier to accommodate pier operations. The asphalt pavement on the North Quay is also to be replaced.
- Drainage, fire protection, potable water service, and lighting improvements are to be installed on the Connecting Pier and new Finger Pier. Utility lines and connections need to be made along the perimeter of harbor facility, and are likely extend through the North Quay; however, utilities are not to be provided along the North Quay berths during Phase 1. Existing lighting along the perimeter fence on the North Quay remains operational.

#### Phase 2:

- This phase represents the modernization of the North Quay berths (1 to 3).

- The North Quay berths (1 to 3) eventually need to be strengthened or replaced due to on-going deterioration and substandard design. The recommended strengthening is the installation of a new tied-back steel sheet pile bulkhead outboard of the existing sheet pile that is to be buried in place. The new sheet pile bulkhead is to be fitted with berthing fenders and mooring hardware.
- Drainage, fire protection, potable water service, and lighting improvements are to be installed on the North Quay berths (1 to 3). This work requires demolition and replacement of the asphalt pavement impacted by the new construction.

The anticipated schedule based on design-bid-build method of procurement to complete the Tinian Inner Harbor modernization project, assuming entitlement and environmental process cover all work to be constructed in the project to be completed under Phase 1 and independent procurement and mobilization for each of the two phases, is summarized as follows:

Phase 1:

- Develop RFP and Solicitation for Environmental and Design Services: 6 months
- Entitlement/Environmental Process: 18 to 24 months
- Design and Construction Document Development: 11 months (concurrent with Entitlement/Environmental Process)
- Bid and Award: 4 to 6 months (commences after receipt of all permits)
- Construction: 16 to 18 months
- Total duration of approximately 4 1/2 years

Phase 2:

- Develop RFP and Solicitation for Environmental and Design Services: 6 months
- Design and Construction Document Development: 6 months
- Bid and Award: 4 to 6 months (assumes all permits in hand during Phase 1)
- Construction: 18 to 20 months
- Total duration of approximately 3 1/4 years

The detailed construction schedule is provided in Appendix E.

## 10.0 Opinion of Probable Construction and Project Cost

Rough Order of Magnitude (ROM) construction and project cost estimates were developed for the proposed improvements at Tinian Inner Harbor. The purpose of the ROM cost estimates is to provide a comparative basis between the various alternatives to facilitate identification of an alternative moving forward. Based on the limited engineering design completed to date, the ROM cost estimates are not meant to be used to establish project budgets. It should also be noted that parameters other than cost may be likely to influence CIP's and stakeholder's decision process, including operational flexibility, implementation schedule, and project scope.

The ROM construction and project costs for Phase 1 and Phase 2 are summarized in Table 9.1 and 9.2 below based on the following assumptions:

1. The 20% of construction cost contingency represents uncertainty in the quantities and scope based on the level of engineering analysis completed to date. It is considered an appropriate allowance at this conceptual stage of project development.
2. A 25% of construction cost allowance is used to cover permitting, EA/EIS/NEPA process, design, construction Management, and owner costs. (in % construction cost: permitting 3%; EA/EIS/NEPA process, 5%; design 8%, construction management, 6%; owner costs 3%)
3. Owner cost are considered to be in-house expenses incurred by CIP to execute and manage the project. CIP's practice may result in lower or higher costs than those assumed for these estimates.
4. Permitting, EA/EIS/NEPA process costs can vary widely depending on the issues identified by the Regulators. Actual entitlement or environmental costs may result in lower or higher costs than those assumed for these estimates.
5. The existing North Quay bulkhead will continue to corrode in the marine environment, and a sacrificial cathodic protection (CP) system is included in the Phase 1 work. It is expected that the CP system will need to be replaced every 7 to 10 years to delay the rate of corrosion deterioration, until the new bulkheads are installed as part of the Phase 2 work. The CP system will cost approximately \$300,000 per installation.

Table 10-1– Phase 1 Opinion of Probable Construction and Project Cost Summary

ITEM DESCRIPTION	ALTERNATIVE		
	1	2	3
DREDGING	\$10,820,000	\$14,760,000	\$12,590,000
WEST END OF BERTH 4, FINGER PIER, EAST CONNECTING PIER AND RAMP BULKHEAD UPGRADES	\$21,980,000	\$22,930,000	\$25,640,000
NORTH QUAY REPAIRS (BERTHS 1, 2 AND 3)	\$810,000	\$810,000	\$810,000
PAVEMENTS AND UTILITIES (PHASE 1)			
AC Pavement (NORTH QUAY BERTHS 1 - 3)	\$6,316,800	\$6,134,520	\$6,134,520
Drainage System Improvements (CONNECTING PIER AND NEW FINGER PIER)	\$576,700	\$567,700	\$784,500
Fire Protection Improvements (CONNECTING PIER AND NEW FINGER PIER)	\$142,500	\$151,300	\$172,200
Potable Water Service Improvements (CONNECTING PIER AND NEW FINGER PIER)	\$44,370	\$45,870	\$38,490
Lighting Improvements (CONNECTING PIER AND NEW FINGER PIER)	\$237,800	\$237,800	\$308,600
ENGINEERED COASTAL PROTECTION	\$1,590,000	\$1,590,000	\$2,020,000
ENVIRONMENTAL BMPs	\$250,000	\$250,000	\$250,000
<b>PHASE 1 CONSTRUCTION SUB TOTAL</b>	<b>\$42,770,000</b>	<b>\$47,480,000</b>	<b>\$48,750,000</b>
Prime Contractor Home Office Overhead and Profit (15%)	\$6,420,000	\$7,120,000	\$7,310,000
Mobilization/Demob/Field OH (5%)	\$2,460,000	\$2,730,000	\$2,800,000
Contingency (20%)	\$10,330,000	\$11,470,000	\$11,770,000
<b>PHASE 1 CONSTRUCTION SUB TOTAL</b>	<b>\$61,980,000</b>	<b>\$68,800,000</b>	<b>\$70,630,000</b>
Environmental Mitigation (5%)	\$2,140,000	\$2,370,000	\$2,440,000
Permitting, EA/EIS/NEPA, Design, Construction Management, Owner Costs (25%)	\$10,690,000	\$11,870,000	\$12,190,000
<b>PHASE 1 PROJECT TOTAL</b>	<b>\$74,810,000</b>	<b>\$83,040,000</b>	<b>\$85,260,000</b>

Table 10-2 – Phase 2 Opinion of Probable Construction and Project Cost Summary

ITEM DESCRIPTION	COST
BULKHEAD UPGRADES	\$15,900,000
NORTH QUAY REPAIRS	\$390,000
PAVEMENTS AND UTILITIES (PHASE 2)	
AC Pavement (NORTH QUAY BERTHS 1, 2, 3)	\$970,100
Drainage System Improvements (NORTH QUAY BERTHS 1, 2, 3)	\$787,300
Fire Protection Improvements (NORTH QUAY BERTHS 1, 2, 3)	\$259,900
Potable Water Service Improvements (NORTH QUAY BERTHS 1, 2, 3)	\$74,090
Lighting Improvements (NORTH QUAY BERTHS 1, 2, 3)	\$172,320
<b>PHASE 2 CONSTRUCTION SUB TOTAL</b>	<b>\$18,550,000</b>
Prime Contractor Home Office Overhead and Profit (15%)	\$2,780,000
Mobilization/Demob/Field OH (5%)	\$1,070,000
Contingency (20%)	\$4,480,000
<b>PHASE 2 CONSTRUCTION SUB TOTAL</b>	<b>\$26,880,000</b>
Permitting, EA/EIS/NEPA, Design, Construction Management, Owner Costs (25%)	\$4,640,000
<b>PHASE 2 PROJECT TOTAL</b>	<b>\$31,520,000</b>

The detailed estimates are provided in Appendix F.

The estimates presented above are an opinion of construction cost made by the Consultant based on early 2015 costs. The unit rates used in these estimates have not been indexed for inflation relative to future scheduling. In providing opinions of construction cost, it is recognized that neither the client nor the Consultant has control over the costs of labor, equipment, or materials, or over Contractors' methods of determining prices or bidding. These opinions of construction cost are based on the Consultant's reasonable professional judgment and experience and do not constitute a warranty, expressed or implied, that Contractors' bids or negotiated prices of the work will not vary from the client's budget or from any opinion of cost prepared by the Consultant.

## 11.0 Conclusions

This study identified scope to improve the existing Tinian Inner Harbor facilities (piers and quays) to meet the anticipated future uses of the facility. A road map on the implementation of the recommended improvements was developed in the form of a project schedule and cost estimates.

The key findings and recommendations presented in the study are summarized as follows:

1. Further project development is to base on Harbor Layout Alternative 3 with 700 ft x 300 ft new Finger Pier and deck elevation at 10 ft MLLW as shown on Figure 11-1.

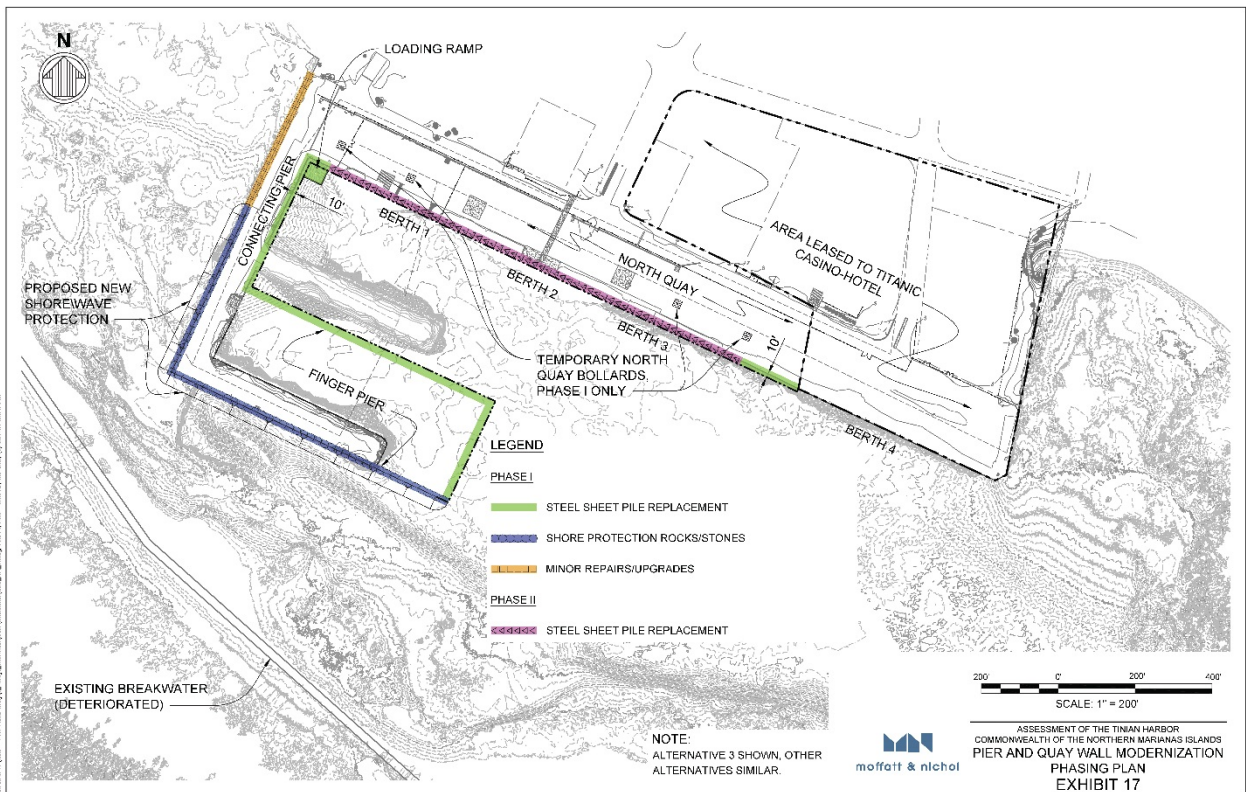


Figure 11-1 - Piers and Quay Wall Modernization

2. Additional field work recommended to address known data gaps
  - a. Test pit excavations along the North Quay (Berth 1 to 3) to inspect the arrangement and conditions of the existing tie-back system.
  - b. Updated survey of the harbor construction area to locate obvious (near-surface) unexploded ordnances.
  - c. Bottom sampling of the harbor sediments to test for potential contaminants and material characterization to evaluate the material for re-use potential and disposal constraints.



3. Entitlement/Environmental Process
  - a. NEPA, EA/EIS and other permitting work as described in the report.
  - b. Marine biota survey within the harbor
  - c. Underwater historical and cultural surveys within the harbor
  - d. Other technical studies identified by environmental consultants and resource agencies
  - e. On completion of the NEPA/EA/EIS, identification of a “preferred alternative” for implementation
4. Project Development and implement (assuming traditional Design-Bid-Build approach)
  - a. Design and construction document development
  - b. Advertise project for construction
  - c. Bidding, evaluation and award
5. Near-Term - Proposed Phase 1 Improvements (North Quay Berth 4, Connecting Pier, Finger Pier)
  - a. Harbor dredging, -28 ft MLLW at turning basin and berths; -30 ft MLLW at channel
  - b. Construct new tie-back steel sheet pile bulkhead at East side of Connecting Pier and North and East sides of Finger Pier, including appropriate mooring hardware and fender systems
  - c. Reinforce west side of Connecting Pier and south side of Finger Pier with protection rock revetment
  - d. Reconstruct west end of Berth 4 (outside of proposed Tinian Casino-Hotel lease area) with new tied-back steel sheet pile bulkhead
  - e. Miscellaneous North Quay repairs to maintain operability, including concrete cap repairs, installation of bulkhead corrosion protection system at Berths 1 to 3, and mooring hardware and fender system upgrades at Berth 1 and 3.
  - f. Construct new ramp at junction between Connecting Pier and North Quay
  - g. Install new asphaltic concrete pavements throughout the facility
  - h. Install potable water, fire protection, and lighting on new Connecting and Finger Piers
6. Long-Term - Proposed Phase 2 Improvements (North Quay Berth 1 to 3)
  - a. Reconstruct North Quay Berths 1 to 3 with new tied-back steel sheet pile bulkhead, including upgraded mooring hardware and fender systems
  - b. Extend potable water, fire protection, and lighting installations to North Quay
  - c. Repair or replace asphaltic concrete pavements

## 12.0 References and Previous Reports

### CNMI Master Plans and Other Government Documents

- Tinian Harbor Master Plan, Commonwealth Port Authority, CNMI, dated July 1997
- Design Data, Navy Department, Bureau of Yards and Dock, Chapter B, Harbor and Waterfront Improvements, 1938
- UFC 4-150-06, Military Harbor and Coastal Facilities
- UFC 4-152-01, Design: Piers and Wharves

### Drawings:

- Second Provisional Base, Sixth Naval Construction Battalion, Waterfront Installation, Fifth Naval Construction Battalion, 1 May, 1945 (from Seabee Museum)
- Repair of Tinian Harbor Facilities; Northern Marianas; Tinian, M.I.; Construction Contract No. N62766-78-C-0216, As-Built Drawings G-1, C-1, C-2, C-3, C-4, C-5, C-6, C-7, dated January 22, 1980, prepared by Gillham, Koebig & Koebig, Inc.
- Small Boat Basin Improvements and North Quay Wall Repairs, Tinian, (NMI, As-Built Drawings C-1, C-6, C-7 dated November 12, 1985, prepared by Gillham, Koebig & Koebig, Inc.
- Tinian Harbor Emergency Repairs, As-Built Drawings C-1, C-2, C-3, approximately 2007, prepared by FPA Pacific Corp.
- Tinian Harbor Emergency Repairs, Construction Drawings, Dated July 2011, prepared by Winzler and Kelly.

### Study Reports:

- Preliminary Ports and Harbor Study of The Commonwealth of the North Mariana Islands, dated May 1981, prepared for the U.S. Department of The Interior, prepared by U.S. Army of Corps of Engineers, Pacific Ocean Division
- Mobil Oil Tinian Island, Mooring/Berthing Evaluation Study, Report 2007MTE23, dated March 30, 2007, prepared by Exxon Mobil Research and Engineering
- Conceptual Design Report for New Fender System At Tinian Harbor Terminal, Tinian Harbor, Tinian, CNMI, April 2009, prepared for Mobil Oil Guam, Inc., prepared by Moffatt & Nichol
- Basis of Design, Tinian Harbor Emergency Repairs, Tinian Harbor, CNMI, dated July 2011, prepared by Winzler and Kelly.
- Tinian Harbor – Marine Equipment Mobilization; East Quay Dock, dated April 2012, prepared by SSFM International, Saipan
- Tinian Harbor – Marine Equipment Mobilization; Dock Between Finger A and Connecting North Quay, dated April 2012, prepared by SSFM International, Saipan
- Investigation of The Tinian Harbor, Concrete Bulkhead, Bollards and Fenders, dated August 2012, prepared by SSFM International, Saipan
- Rota Harbor Feasibility Study, dated January 2014, prepared by Moffatt & Nichol
- Final Report for Unexploded Ordnance Clearance, US Fragmentation Bombs, Port of Tinian, undated, prepared for CPA, prepared by AMPRO Inc.

**Appendix B Tinian Harbor Master Plan Project Permitting and Environmental Mitigation, prepared by Micronesian Environmental Services, November 2017**

# TINIAN HARBOR MASTER PLAN

## PROJECT PERMITTING AND ENVIRONMENTAL MITIGATION



*Developed for:*

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**April 2018**

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## EXECUTIVE SUMMARY

The following federal and CNMI permits, authorizations, or consultations will be required for implementing the Tinian Harbor Master Plan:

- National Environmental Policy Act of 1969;
- Rivers and Harbors Act of 1899, section 10 (structures in navigable waters);
- Federal Water Pollution Control Act as amended by the Clean Water Act of 1977, sections 402 (NPDES), and 404 (dredge and fill);
- Coastal Zone Management Act of 1972, Federal Consistency Determination;
- Endangered Species Act of 1973, section 7 consultation;
- Fish and Wildlife Coordination Act;
- Magnuson-Stevens Act; section 305 Essential Fish Habitat review;
- National Historic Preservation Act, section 106 Review;
- Division of Environmental Quality section 401 Water Quality Certification; and
- Division of Environmental Quality Earthmoving and Erosion Control Permit.

At a minimum, the following federal and CNMI agencies will be involved in the permitting of the Tinian Harbor Master Plan:

- Federal action agency (unknown);
- U.S. Army Corps of Engineers;
- U.S. Environmental Protection Agency;
- U.S. Fish and Wildlife Service;
- National Marine Fisheries Service;
- CNMI Division of Coastal Resources Management;
- CNMI Department of Lands & Natural Resources/Division of Fish & Wildlife;
- CNMI Division of Historic Preservation; and
- CNMI Division of Environmental Quality.

The U.S. Fish and Wildlife Service and National Marine Fisheries Service has legal responsibility over 66 species listed under the Endangered Species Act as threatened or endangered that may occur in the Mariana archipelago. The federal action agency must consult under section 7 of the ESA for those species where the proposed action may affect a listed species. Based upon a review of life history characteristics, distributional data, and optimal habitat requirements, most of the protected species will have a “*no effect*” designation applied with respect to the section 7 consultation. It is likely that a “*may effect*” determination will be made for:

- Green Sea Turtle (*Chelonia mydas*);
- Hawksbill Sea Turtle (*Eretmochelys imbricata*); and
- the coral *Acropora globiceps*.

Project related impacts anticipated from the proposed action follow:

- The creation of sediment or turbidity plumes associated with dredge/fill activities and terrestrial runoff;
  - may cause behavioral reactions to Federally protected Green and Hawksbill sea turtles that enter the work area;
  - may have a potential for noise related impacts to sea turtles from driving sheet pile during construction of new wharf, depending upon methodology;

- suspended sediment may settle on corals and create stress; suspended sediment may also effect slow moving benthic marine resources (depending upon duration and intensity);
- will increase turbidity levels in vicinity of work areas and possibly violate the CNMI Water Quality Standards;
- Demolition and reconstruction of pier A;
  - will adversely impact slow moving and non-motile benthic resources (e.g., sea cucumbers, urchins, and corals) during construction by removing artificial habitat;
  - may modify existing harbor water current patterns;

General mitigation measures that may be required:

- Ensure that construction material and debris does not fall into harbor waters during the construction period;
- Install silt curtains to contain sediment plumes and conduct daily maintenance inspections to ensure they are functioning properly. Design and implement a turbidity monitoring regime in cooperation with the Division of Environmental Quality as required by the Clean Water Act Section 401 Water Quality Certification;
- Have an environmental specialist oversee turbidity compliance monitoring efforts and to address permit compliance with other environmental permits;
- Keep watch for the presence of the threatened green and hawksbill sea turtles. If a turtle swims into the work area, stop work until the turtle leaves the area on its own volition;
- Temporarily cease in-water dredging activities for 21 calendar days during the largest annual coral spawning event in May or June;
- Relocate slow-moving benthic resources (e.g., sea cucumbers, sea stars, sea urchins, etc.) away from immediate work areas prior on a daily basis prior to commencement of in-water work;
- Impacts to “*special aquatic resources*” (e.g., corals or sea grasses) will require the development and implementation of a compensatory mitigation plan, as required by the 2008 Federal Compensatory Mitigation for Losses of Aquatic Resources regulations;
- Dredge and fill activities should cease during times of small craft warnings or high surf advisories, as issued by the CNMI Department of Homeland Security or U.S. Coast Guard.

Estimated Costs:

Compliance with the National Environmental Policy Act was not included in the itemized costs analysis as it is dependent upon several variables that strongly influence costs: whether the Master Plan will be implemented by phase, if an EA or EIS would be pursued, and the NEPA requirements of the Federal action agency. If the entire Master Plan would go through the NEPA process at one time, it is estimated that costs could range from \$95K to \$200K.

The estimated permitting and survey costs is \$390,000, while the estimated cost for post-permit issuance mitigation is \$335,000.

Scheduling:

Estimating the schedule for a large complex marine oriented project, such as the Tinian Harbor improvements project, is difficult at best as most of the permitting time will be contingent upon agency review and development of mitigation measures. The applicant will not have any control over agency review time and issuance of required permits. For purposes of this review and assuming a smooth permitting review/processing, the EA process is estimated to take 15 months and the EIS process 21 months.

# PROJECT PERMITTING AND ENVIRONMENTAL MITIGATION

## I. PROJECT PERMITTING

This section will address environmental regulatory laws and regulations that will be required to implement the Tinian Harbor Master Plan. In addition, discussion will also focus on sensitive biological issues, such as federal and CNMI listed endangered and threatened species, special aquatic sites, and essential fish habitat; issues that will guide project development and mitigation requirements.

The proposed Tinian Harbor improvement project will require multiple Federal and local CNMI environmental permits. Although multiple permits will be required for the same action, all the following permits must be obtained prior to starting work.

### Federal Permits

The U.S. Army Corps of Engineers (USACOE) will need to issue two permits;

- Clean Water Act (CWA); section 404, and the
- Rivers & Harbors Act of 1899 (R&HA); section 10 permit.

Associated with these permits are additional inter-agency consultations or coordination as required by USACOE National Environmental Policy Act (NEPA) requirements:

- Endangered Species Act (ESA); section 7 consultation with National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS);
- Magnuson-Stevens Act (MSA); section 305 Essential Fish Habitat (EFH) review with NMFS;
- Fish and Wildlife Coordination Act (FWCA) with the USFWS; and
- National Historic Preservation Act (NHPA); section 106 review with CNMI Historic Preservation Office (HPO).

Depending upon the magnitude of impacts to federally protected species, the NMFS and USFWS may need to enter into formal section 7 consultation with the USACOE and issue a Biological Opinion that would authorize the incidental take of a protected species.

The U.S. Environmental Protection Agency (USEPA) will require a General Construction permit;

- CWA; section 402 NPDES Construction General Permit Notice-Of-Intent (NOI) with the approval of the Division of Environmental Quality (DEQ).

### CNMI Permits

The two local CNMI environmental permitting agencies are under the Bureau of Environmental and Coastal Quality (BECQ); the Division of Coastal Resources Management Office (DCRM) and Division of Environmental Quality (DEQ). The following permits will be required:

- DCRM Major Siting permit and/or Federal Consistency determination;
- DEQ Earthmoving and Erosion Control permit; and
- DEQ Clean Water Act; section 401 Water Quality Certification.

### Involved Governmental Agencies

Other agencies are also intimately involved in the permitting review process through administrative reviews and/or required consultations. Those agencies include:

- NMFS;
  - Protected Resources Division (ESA section 7 consultation)
  - Habitat Conservation Division (MSA Essential Fish Habitat review)



- USFWS (ESA section 7 consultation);
- CNMI Department of Lands & Natural Resources/Division of Fish & Wildlife (DLNR/DFW);
- CNMI Historic Preservation Office (NHPA, section 106 review); and
- CNMI Department of Public Safety (UXO Disposal Plan review).

However, before any permit applications can be submitted for agency review and action, the federal action agency (assuming the project will be federally funded) must comply with the National Environmental Policy Act (NEPA) policy guidelines developed for that agency.

#### **A. National Environmental Policy Act**

For purposes of this permitting review, it will be assumed that funding will originate from a federal agency. For every federal action, NEPA requires the sponsoring federal agency to develop documentation supporting a level of review appropriate for the environmental, cultural or social impacts the project is expected to create. With respect to the proposed action, NEPA will require the development of an Environmental Impact Statement (EIS) or an Environmental Assessment (EA). The EIS is a higher level of review that is more time consuming and costly. Although not inclusive, components of the EA or EIS includes; biological assessment, archeological and cultural resources assessment report, unexploded ordinance survey report, harbor sediment contamination study, traffic assessment report, solid waste disposal report, socio-economic report, and alternatives analysis. The NEPA document does not result in the issuance of a permit, however the information contained in the document will be required by various permit applications and be used in the federal decision making process.

#### **B. Federal Permits and Authorizations**

Many complex aquatic-based projects, such as the Tinian Harbor Master Plan, will require the two major permits issued by the USACOE; the Clean Water Act (section 404) and the Rivers and Harbors Act of 1899 (section 10). For ease in communication when both permits are required, the USACOE typically notes it as a section 10/404 permit. The USACOE is the lead agency in the issuance of these permits and, in addition, must comply with their agency's NEPA regulations. Therefore, the USACOE takes the lead in compliance with the ESA section 7 consultation, section 106 NHPA review, MSA section 305 Essential Fish Habitat consultation, and the Fish and Wildlife Coordination Act. All these inter-agency consultations must be completed prior to the USACOE issuing any permits.

Though not directly involved with the day-to-day processing of CWA applications by the USACOE, the U.S. Environmental Protection Agency (USEPA) jointly oversees implementation of this regulatory program.

#### **1. U.S. Army Corps of Engineers, (a) Clean Water Act, Section 404**

*Section 404 of the Clean Water Act (CWA) establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. Activities in waters of the United States regulated under this program include fill for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports) and mining projects. Section 404 requires a permit before dredged or fill material may be discharged into waters of the United States, unless the activity is exempt from Section 404 regulation (e.g., certain farming and forestry activities).*

*The basic premise of the program is that no discharge of dredged or fill material may be permitted if: (1) a practicable alternative exists that is less damaging to the aquatic environment or (2) the nation's waters would be significantly degraded. In other words, when you apply for a permit, you*

*must first show that steps have been taken to avoid impacts to wetlands, streams and other aquatic resources; that potential impacts have been minimized; and that compensation will be provided for all remaining unavoidable impacts.*<sup>1</sup>

### **(b) Rivers and Harbors Act of 1899, Section 10**

*Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) prohibits the unauthorized obstruction or alteration of any navigable water of the United States. This section provides that the construction of any structure in or over any navigable water of the United States, or the accomplishment of any other work affecting the course, location, condition, or physical capacity of such waters is unlawful unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of the Army. The Secretary's approval authority has since been delegated to the Chief of Engineers.*<sup>2</sup>

A section 10/404 permit will be required as the proposed action includes approximately 250,00 cy of maintenance dredging, 50,000 cy of new dredging, and modification of finger pier A.

Due to the military history of Tinian Harbor, the USACOE and the DEQ will likely require testing of bottom sediments for contaminants prior to dredging and use as fill material. This will require coordination with the relevant agencies to determine what specific tests would be required. Should contaminated bottom sediments be discovered, then a separate land-based dredge material disposal plan must be developed according to governmental guidelines established by the USACOE, USEPA, and DEQ for the specific identified contaminants.

Local knowledge indicates that unexploded ordinance (UXO) are present in the Tinian Harbor. This poses a unique human safety threat for the company contracted to do the dredging and dock repairs. It will be necessary to conduct a UXO survey over, at a minimum, the harbor area being proposed for dredging. Should any UXO be located, it will have to be removed prior to in-water work. The USACOE, CNMI Division of Environmental Quality (DEQ), and Department of Public Safety (DPS) will review and likely have to approve the UXO survey procedures and disposal protocol.

## **2. Required Interagency Consultations**

### **(a) Magnuson-Stevens Act, section 305 Essential Fish Habitat**

On October 11, 1996, the Sustainable Fisheries Act (Public Law 104-297) became law and amended the habitat provisions of the Magnuson Act. The re-named Magnuson-Stevens Act (MSA) calls for direct action to stop or reverse the continued loss of fish habitats. To this end, Congress mandated the identification of habitats essential to managed species and measures to conserve and enhance habitat that these species required. The MSA requires cooperation among National Marine Fisheries Service (NMFS), Regional Fishery Councils, fishing participants, Federal and state agencies, and others in achieving the essential fish habitat goals of habitat protection, conservation, and enhancement.

Briefly, an Essential Fish Habitat (EFH) consultation is the process of satisfying the Federal agency consultation and response requirements of section 305(b)(2) and 305(b)(4)(B) of the MSA, and the EFH conservation recommendation requirement of section 305(b)(4)(A) of that Act. When completed, an EFH consultation generally consists of: 1) notification to NMFS of a Federal action that may adversely affect EFH, 2) an EFH assessment provided to NMFS, 3) EFH

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<sup>1</sup> <https://www.epa.gov/cwa-404/section-404-permit-program>

<sup>2</sup> <https://energy.gov/nepa/downloads/33-usc-403-river-and-harbors-act-1899>

conservation recommendations provided by NMFS to the Federal action agency, and 4) the Federal agency's response to NMFS's EFH conservation recommendations.

The consultation requirements of section 305(b) of the MSA (16 U.S.C. 1855(b)) provide that: Federal agencies must consult with the Secretary of Commerce (i.e., through NMFS) on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH. Federal actions included under this consultation process would include the issuance of Clean Water Act section 10/404 permits by the USACOE. These federal permits would be required for the proposed improvements outlined in the Tinian Harbor Master Plan.

The trigger for an EFH consultation is a Federal action agency's determination that an action or proposed action, funded, authorized or undertaken by that agency may adversely affect EFH. If a Federal agency makes such a determination, then EFH consultation is required. If a Federal action agency determines that an action does not meet the "*may adversely affect*" EFH test (i.e., the action will not adversely affect EFH), no consultation is required.

Adverse effect is defined as any impact which reduces the quality and/or quantity of essential fish habitat. Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, or reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). If the USACE determines that an adverse action may occur from the issuance of any particular permit, consultation with the NMFS becomes mandatory. During the consultation process, the Secretary of Commerce (e.g., NMFS) shall provide recommendations (which may include measures to avoid, minimize, mitigate, or otherwise offset adverse effects on EFH) to conserve EFH to Federal (or state) action agencies for activities that would adversely affect EHF. It should be noted that the consultation requirements only require Federal agencies to consult with NMFS about pending federal actions that may adversely affect EFH; NMFS recommendations are not mandatory.

As defined in section 3(10) of the MSA, EFH are those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. Examples of "*waters*" that may be considered EFH include open waters and wetlands, estuarine and riverine habitats, wetlands hydrologically connected to productive water bodies. Water quality is interpreted to be a component of this definition. EFH should consider water to provide the appropriate parameters of quality such as physical, chemical, and biological properties. This may address nutrient levels, oxygen concentrations, turbidity levels, among others. The interpretation of "*substrate*" includes artificial reefs and shipwrecks if those areas provide EFH. Substrate may also include entirely or partially submerged structures, such as jetties. "*Biological communities*" could include mangroves, tidal marshes, mussel beds, cobble with attached fauna, mud and clay burrows, coral reefs, and submerged aquatic vegetation. Migratory routes such as rivers and passes serving as passageways to and from anadromous fish spawning grounds should be considered EFH. The definition of EFH may include habitat for an individual species or an assemblage of species, whichever is appropriate within each FMP. Currently, EFH is defined very broadly with fundamentally all habitats and waters being considered EFH, including all habitats in Tinian Harbor.

Presently, the Western Pacific Regional Fishery Management Council is reviewing original EFH designations and is considering options for refining EFH definitions and policy guidelines. In addition, the USACOE is developing a Programmatic Agreement with the NMFS Pacific Islands Regional Office that would guide EFH consultations in the Western Pacific. It is possible that new policy guidance will be in effect when the Master Plan is implemented.

### **(b) Endangered Species Act, Section 7 Consultation**

The Endangered Species Act (ESA) was initially passed by the U.S. Congress in 1973 and has been re-authorized and amended several times since. The purpose of the ESA, as amended, is to conserve “*the ecosystems upon which endangered and threatened species depend*” and recover listed species. The U.S. Federal Government, under authority of the ESA, protects those wildlife species that have been determined to have dangerously low population levels or are in imminent threat of extinction. Populations of those wildlife species requiring federal protection are either classified as endangered or threatened.

*Endangered* is defined in section 3(6) of the ESA as “...any species [including subspecies or qualifying distinct population segment] which is in danger of extinction throughout all or a significant portion of its range.”

A *threatened* species is defined in section 3(19) of the ESA and is defined as “.... any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.”

Navigating regulatory requirements associated with the presence of threatened or endangered species can become quite involved depending upon the magnitude and nature of the proposed project, and the degree to which early planning and scoping was completed. Under section 9 of the ESA, it is unlawful to “take” a threatened or endangered (e.g., listed) species. The term “take” is defined by the ESA as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct.” The term “harm” has been further defined to include “significant habitat modification or degradation.” The term “harm” may include significant habitat modification resulting in the killing or injuring of a listed species through impairment of essential behavior (e.g., nesting or reproduction). With respect to the proposed Tinian Harbor Master Plan, impacts to protected species will likely be limited to dredge and fill activities related to dock and harbor improvements.

Addressing the ESA “take” prohibition in section 9 will require compliance with the requirements found in sections 7 or 10 of the ESA. Section 7 consultation is for those projects that have a federal nexus and a “may effect” determination. The section 10 Incidental Take Permit is for projects that do not have a federal nexus and that “may effect” a listed species. Examples of a federal nexus are federal funding sources or the requirement of a federal permit, such as the USACOE section 10/404 permit.

Endangered species issues for the Tinian Harbor Master Plan will be addressed through the section 7 consultation process; a process where the USACOE will consult directly with the USFWS and NMFS over potential impacts to federally listed species.

Based on site reports and local knowledge, a “may affect” determination is likely for the Green Sea Turtle (*Chelonia mydas*), Hawksbill Sea Turtle (*Eretmochelys imbricata*), and the coral *Acropora globiceps*. Additional quantitative surveys conducted for the Biological Assessment will determine whether the proposed action is likely to adversely affect these species, or not.

### **(c) Fish and Wildlife Coordination Act**

First enacted in 1934, the Fish and Wildlife Coordination Act (FWCA) is described by NOAA as a requirement by federal agencies to “consult with the U.S. Fish and Wildlife Service, the National Marine Fisheries Service and State wildlife agencies for activities that affect, control or modify waters of any stream or bodies of water, in order to minimize the adverse impacts of such actions on fish and wildlife resources and habitat. This consultation is generally incorporated into the

*process of complying with Section 404 of the Clean Water Act, NEPA or other federal permit, license or review requirements.”*

The USACOE will initiate FWCA consultation with the USFWS and NMFS in addressing the NEPA requirements of issuance of a CWA section 10/404 permit. The resource agencies will review and make mitigation recommendations, in a non-binding manner, to further minimize impacts.

#### **(d) National Historic Preservation Act, Section 106 Review**

*Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires Federal agencies to take into account the effects of their undertakings on historic properties, and afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment. The historic preservation review process mandated by Section 106 is outlined in regulations issued by ACHP.*

*The responsible Federal agency first determines whether it has an undertaking that is a type of activity that could affect historic properties. Historic properties are properties that are included in the National Register of Historic Places or that meet the criteria for the National Register. If so, it must identify the appropriate State Historic Preservation Officer/Tribal Historic Preservation Officer\* (SHPO/THPO\*) to consult with during the process. It should also plan to involve the public, and identify other potential consulting parties. If it determines that it has no undertaking, or that its undertaking is a type of activity that has no potential to affect historic properties, the agency has no further Section 106 obligations.<sup>3</sup>*

Based on an earlier draft report<sup>4</sup> commissioned by the Department of Navy, the structures at Tinian Harbor were found to be eligible as a historic district under criteria A and C. An Archeological and Cultural Resources Report will have to be developed by a qualified archeologist that will analyze the extent of how the proposed action will affect Tinian Harbor infrastructure relative to its historical significance. The report will also address any other impacts to historical issues of significance found within the project area. This report will be the basis for the NHPA section 106 review between the USACOE and the CNMI HPO. Unless significant impacts are expected, it is doubtful that the ACHP will get involved. The USACOE will need to complete this review prior to issuance of any permit.

### **3. U.S. Environmental Protection Agency, NPDES Construction General Permit NOI**

Not actually a permit, a NPDES (CWA section 402) Construction General Permit Notice-of-Intent (NOI) is to be submitted to the U.S. Environmental Protection Agency in coordination with the DEQ during the application and review phase of the Earthmoving and Erosion Control application. The NOI is required for construction sites greater than one acre in size and requires the development of a DEQ approved Storm Water Pollution Prevention Plan.

#### **C. CNMI Permits**

The Bureau of Coastal and Environmental Quality is comprised of the Division of Coastal Resources Management (DCRM) and the Division of Environmental Quality (DEQ). The proposed action will require a two permits from the DEQ and regulatory clearance (or permit) from the

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<sup>3</sup> <http://www.achp.gov/106summary.html>

<sup>4</sup> Architectural Survey of Tinian Harbor and Voice of America Facility, Tinian, Commonwealth of the Northern Mariana Islands Supporting the Joint Guam Build-Up Environmental Impact Statement (DRAFT). May 2010. Prepared for: Department of Navy, Naval Facilities Engineering Command, Pacific, Pearl Harbor, Hawaii. Prepared by TEC Inc.

DCRM. Both of these agencies will be heavily involved in the issuance of permits for the proposed action. The applicant will be responsible for obtaining these approvals or permits.

### **1. Division of Coastal Resources Management**

The Division of Coastal Resources Management (DCRM) is the federally approved state agency that manages the federal Coastal Zone Management Program in the CNMI. It acts as an umbrella agency for six other CNMI Government agencies; Department of Public Works, Department of Commerce, Department of Lands and Natural Resources, Division of Environmental Quality, Commonwealth Utilities Corporation, and Division of Historical Preservation. Representatives from these agencies constitute the CRM Board of Directors whose responsibility includes the review and issuance of permits for development projects that may have an impact on coastal resources. The DCRM is a line agency under the Bureau of Coastal and Environmental Quality.

Assuming the Tinian Harbor Master Plan will be funded by federal sources, the federal action agency will likely request the DCRM to review and approve the proposed action through the federal consistency determination process. This authorization will be required prior to the USACOE issuing a federal CWA section 10/404 permit.

### **2. Division of Environmental Quality**

The Division of Environmental Quality (DEQ) is responsible for regulating a myriad of environmental issues; enforcing the marine water quality standards, drinking water standards, earthmoving activities, well drilling activities, hazardous waste disposal, solid waste disposal, and wastewater disposal. The DCRM is a line agency under the Bureau of Coastal and Environmental Quality.

The Division of Environmental Quality (DEQ) will need to issue two permits for the proposed action: an Earthmoving and Erosion Control Permit and a section 410 Water Quality Certification.

Issuance of the Earthmoving and Erosion Control Permit will address surface runoff into adjacent marine waters. Temporary and permanent erosion control plans must be developed and stamped by a CNMI registered professional engineer. In addition, the Storm Water Pollution Prevention Plan must be reviewed/approved by the DEQ and documentation showing that the applicant has complied with the NOI requirements of the Construction General Permit (CWA section 402 NPDES) must be submitted to the DEQ for approval prior to submittal to the USEPA.

With respect to the section 401 Water Quality Certification, the DEQ will require the development of an Environmental Protection Plan. This document will outline specific mitigation and monitoring measures that would help minimize impacts from the turbidity plumes generated from in-water construction activities. The plan will also include a daily monitoring of turbidity levels at pre-determined stations and reporting requirements to the DEQ. In addition, a process or plan to address water quality standard violations must be developed and approved by the DEQ. This authorization will be required prior to the USACOE issuing a CWA section 10/404 permit.

## **II. Federal and CNMI Protected Species**

### **A. Terrestrial Fauna and Flora**

The U.S. Fish and Wildlife Service (USFWS) has identified 30 threatened/endangered species within the Commonwealth of the Northern Mariana Islands (CNMI): two mammals, six birds, four reptiles (three sea turtles, one skink), three insects, three gastropods, and 12 plants. General jurisdiction of the USFWS includes terrestrial and freshwater wildlife, while the National Marine Fisheries Service's (NMFS) primary responsibility is marine wildlife species. Enforcement of the

ESA for sea turtles is shared between the USFWS (Department of Interior) and the NMFS (Department of Commerce).

The CNMI Government passed a law on 15 January 1991 identifying locally threatened/endangered species. This original list includes 14 species from the entire CNMI: two mammals, seven birds, three reptiles, and two plant species. The CNMI law did not differentiate between threatened and endangered categories and are thus jointly classified. The CNMI list contains two species not officially recognized as either threatened or endangered by the Federal Government; the Micronesia Saw-tailed Gecko (*Perochirus ateles*) and Cordon de San Francisco (*Lycopodium phlegmaria* var. *longifolium*).

Table 1 identifies those species listed by the USFWS and CNMI Government that may occur or have historically occurred on Tinian.

Table 1. Federal and CNMI listed threatened/endangered terrestrial species that may occur or have historically occurred on Tinian. Information obtained from USFWS (2011), Liske-Clark (2015), USFWS (2015), and USFWS (2017). Scientific and common names follow USFWS (2011, 2015) (for mammals); Gill and Donsker (2017) (for avifauna); Zug (2013) and USFWS (2017) (for herpetofauna); USFWS (2015) (for gastropods); and Stone (1970) (for plants). T=Threatened, E=Endangered, NR=Not recognized.

LISTED SPECIES	FEDERAL	CNMI
<b>MAMMALS</b>		
Mariana Fruit Bat ( <i>Pteropus m. mariannus</i> )	T	T/E
Pacific Sheath-tailed Bat ( <i>Emballonura semicaudata rotensis</i> )	E	T/E
<b>AVIFAUNA</b>		
Micronesian Megapode ( <i>Megapodius l. laperouse</i> )	E	T/E
Mariana Common Moorhen ( <i>Gallinula chloropus guami</i> )	E	T/E
<b>HERPETOFAUNA</b>		
Mariana Skink ( <i>Emoia slevini</i> )	E	NR
Micronesia Saw-tailed Gecko ( <i>Perochirus ateles</i> )	NR	T/E
Green Sea Turtle ( <i>Chelonia mydas</i> )	T	T/E
Hawksbill Sea Turtle ( <i>Eretmochelys imbricata</i> )	E	T/E
Leatherback Sea Turtle ( <i>Dermochelys coriacea</i> )	E	NR
<b>GASTROPODS</b>		
Humped Tree Snail ( <i>Partula gibba</i> )	E	NR
<b>PLANTS</b>		
Berenghenas Halomtano ( <i>Solanum guamense</i> )	E	NR
<i>Tuberolabium guamense</i>	T	NR
Ufa-halomtano ( <i>Heritiera longipetiolata</i> )	E	NR
<i>Dendrobium guamense</i>	T	NR

Most of the protected terrestrial species are not found in the area of the Tinian Harbor project site.

The following species summary is provided for each of the federally listed species and concludes with a preliminary effects determination, as it relates to the ESA section 7 consultation. The preliminary effects determination is based on the species' life history characteristics, habitat requirements, historical knowledge of the project site, the known resources, and the potential impacts from the proposed action. This determination does not pre-empt the need for additional resource surveys.

#### Mammals

##### Mariana Fruit Bat (*Pteropus m. mariannus*)

The Mariana Fruit Bat (*Pteropus m. mariannus*) is a medium-sized colonial flying fox, with body length 7.7 to 9.8 inches, forearm length 5.3 to 6.1 inches, wingspan 33.9 to 41.9 inches, and body weight 0.7 to 1.3 pounds (USFWS 1990, 2009). This subspecies was federally listed as endangered on Guam in 1984 (USFWS 1984). However, in 2005, the USFWS determined that movement of fruit bats occurs between all islands in the Mariana archipelago, resulting in exchange of genetic material. Consequently, Mariana Fruit Bats on Guam and throughout the CNMI comprise one subspecies and are presently listed as threatened throughout their entire range (USFWS 2005b).

In the Mariana Islands, the Mariana Fruit Bat is known to occur on all islands extending northward from Guam to Maug (Wiles et al. 1989, Johnson 2001, Vogt 2009). No critical habitat has been designated for this subspecies in the CNMI. The Mariana Fruit Bat was afforded threatened/endangered status by the CNMI Government, published in the Commonwealth Register on 15 January 1991.

Based on the lack of optimal habitat for this species at Tinian Harbor, a “no effect” determination is anticipated.

##### Pacific Sheath-tailed Bat (*Emballonura semicaudata rotensis*)

Four subspecies of the Pacific Sheath-tailed Bat are known from islands distributed throughout Micronesia and Polynesia (Wiles and Brooke 2009). The Pacific Sheath-tailed Bat (*Emballonura semicaudata rotensis*) is the only insectivorous bat found in the Mariana Islands. It was once present on the islands of Saipan, Tinian, Aguiguan, Rota, Guam, and possibly Anatahan and Maug, but currently, the only remaining population consists of 359–466 individuals on Aguiguan (Wiles et al. 2011, USFWS 2015).

Observations of small bats (presumably Pacific Sheath-tailed Bats) were recorded on Rota and Aguiguan between the 1940s and late 1960s, and on Saipan, Anatahan, and East Island (Maug) in 1976 (Lemke 1986). This bat was last observed on Guam in 1972 and seemingly disappeared from Rota shortly after the observations in the 1960s (Lemke 1986).

The Pacific Sheath-tailed Bat was federally listed as endangered on 1 October 2015 (USFWS 2015). No critical habitat has been designated for this subspecies. This subspecies is recognized as threatened/endangered by the CNMI Government.

Based on the lack of optimal habitat for this species at Tinian Harbor, a “no effect” determination is anticipated.



## Avifauna

### Micronesian Megapode (*Megapodius l. laperouse*)

The Micronesian Megapode (*Megapodius l. laperouse*) is found in the Mariana and Palau Islands and is comprised of two subspecies: *Megapodius l. laperouse*, which occurs in the Mariana Islands and *Megapodius laperouse senex*, which occurs in the Palau Islands.

The Mariana Islands subspecies of the Micronesian Megapode was listed as an endangered species by the USFWS on 2 June 1970 (USFWS 1970). To date, no critical habitat has been designated for this subspecies. The CNMI Government also classified this subspecies as threatened/endangered, and included it on the local CNMI list that was published in the Commonwealth Register on 15 January 1991.

The Micronesian Megapode is a pigeon-sized, dark brown to blackish land bird that forages on the ground and roosts on tree branches. The most distinct characteristic of this bird is its nest, which is built on the ground in the form of a large mound (with tunnels or burrows). The nest may be made of leaves, soft soil, organic litter, and cinder (Dekker 1990, Stinson 1992). The heat from the mound incubates the eggs laid in its center (Pratt et al. 1987). The incubation period of the Micronesian Megapode is unknown as this subspecies does not actively maintain its nest after egg-laying.

Within the Mariana Islands, the megapode was historically widespread and has been documented on all 15 islands in the Mariana archipelago (USFWS 1998). Populations currently persist on 13 of the islands in the archipelago, excluding Guam and Rota (Falanruw 1975, USFWS 1998).

The Micronesian Megapode is considered extirpated on Guam and Rota (Engbring and Pratt 1985, Reichel and Glass 1991, Stinson 1994, Steadman 1999). Despite intensive avian surveys on Rota in 1982, 1995, 2004, and 2012, megapodes were not recorded (Engbring et al. 1986, Fancy et al. 1999, Amar et al. 2008, Camp et al. 2015). Nonetheless, there have been unconfirmed reports of megapode observations in the Palie, Sabana, and Sinapalo (near Mochon Point) regions of Rota (Engbring et al. 1986).

Based on the lack of optimal habitat for this species at Tinian Harbor, a “no effect” determination is anticipated.

### Mariana Common Moorhen (*Gallinula chloropus guami*)

The Mariana Common Moorhen (*Gallinula chloropus guami*) is a mostly dark to sooty gray water bird, about 13 inches in body size, possessing a red bill with a yellow tip, red frontal shield, and yellow legs (Baker 1951, Pratt et al. 1987). The *guami* subspecies is limited to the Mariana archipelago and is presently found on Saipan, Tinian, Rota, and Guam (Takano and Haig 2004a). The Mariana Common Moorhen was listed as endangered by the USFWS on 27 August 1984 (USFWS 1984); no critical habitat has been designated. The CNMI Government also classified this subspecies as threatened/endangered, and included it on the local CNMI list that was published in the Commonwealth Register on 15 January 1991.

The Mariana Common Moorhen relies on both permanent and seasonal freshwater wetland habitats for feeding, nesting, and loafing (USFWS 2012).

In 2001, the adult Mariana Common Moorhen population in the Mariana Islands was estimated at 287, with 154 adult birds present on Saipan, 41 on Tinian, two on Rota, and 90 on Guam (Takano and Haig 2004a). Current populations are estimated at 100 moorhens on Saipan, 50 on Tinian, less than 10 on Rota, and 100-150 on Guam (USFWS 2012). Though the moorhen was

considered extirpated from Rota, several individuals were documented reproducing in the waste water treatment ponds located at the Rota Resort in 1995 and 1996 (Worthington 1998). Moorhens were also observed using the water hazard ponds at the resort's golf course in late 1995 (Worthington 1998). Moorhens were detected in the water hazard ponds as recently as August 2016 (CNMI-DFW 2017).

Based on the lack of optimal habitat for this species at Tinian Harbor, a “*no effect*” determination is anticipated.

#### Herpetofauna

##### Mariana Skink (*Emoia slevini*)

The Mariana Skink (*Emoia slevini*), first described in 1972 (Brown and Falanruw 1972), is the only lizard endemic to the Mariana Islands (Zug 2013). It inhabits forested areas, where individuals are known to use leaf litter as cover on the forest floor, as well as low hollows of tree trunks (Brown and Falanruw 1972, GDAWR 2006).

Historically found on the southern Mariana Islands of Guam, Cocos, Rota, Tinian, and Aguiguan, *E. slevini* is believed to be extirpated on all, but Cocos (USFWS 2015). In the Northern Mariana Islands, the Mariana Skink has been recorded on Sarigan, Guguan, Alamagan, Pagan, and Asuncion (GDAWR 2006, Liske-Clark 2015).

The Mariana Skink was federally listed as endangered on 1 October 2015 (USFWS 2015). No critical habitat has been designated for this species. This species has not been recognized as threatened/endangered by the CNMI Government.

Based on the lack of optimal habitat for this species at Tinian Harbor, a “*no effect*” determination is anticipated.

##### Micronesia Saw-tailed Gecko (*Perochirus ateles*)

The Micronesia Saw-tailed Gecko (*Perochirus ateles*) is indigenous to the Mariana Islands and known from Guam, Cocos, Rota, Tinian, and Saipan (Rodda et al. 1991, Wiles and Guerrero 1996, Perry et al. 1998, Rodda and Dean-Bradley 2000, Rodda et al. 2009). The Micronesia Saw-tailed Gecko inhabits limestone forest and large trees, but has been observed near urban structures (Vogt and Williams 2004).

The Micronesia Saw-tailed Gecko is considered to be extirpated from Guam due to intense predation by the Brown Treesnake (Rodda and Fritts 1992). A *P. ateles* population persists on Cocos (Perry et al. 1998); however, abundance, habitat use, and status information are unknown. Very few Micronesia Saw-tailed Gecko records have been reported from Rota ( $n = 2$ ) and Tinian ( $n = 3$ ) (Wiles et al. 1989a, Rodda and Dean-Bradley 2000, Rodda et al. 2009).

The Micronesia Saw-tailed Gecko is listed as threatened/endangered by the CNMI Government. This species has not been recognized as threatened/endangered by the USFWS.

Based on the lack of optimal habitat for this species at Tinian Harbor, a “*no effect*” determination is anticipated.

#### Gastropods

##### Humped Tree Snail (*Partula gibba*)

The Humped Tree Snail (*Partula gibba*) is the most widely distributed tree snail in the Mariana archipelago, originally known from nine islands: Guam, Rota, Aguiguan, Tinian, Saipan,

Anatahan, Sarigan, Alamagan, and Pagan (Smith et al. 2008). Currently, the species is present on Guam, Rota, Saipan, Tinian, Sarigan, Alamagan, and Pagan (Hadfield 2010, DON 2014, USFWS 2015). Individuals initially identified as Humped Tree Snails on Rota may be a different species (USFWS 2015).

The Humped Tree Snail was federally listed as endangered on 1 October 2015 (USFWS 2015). No critical habitat has been designated for this species. This species has not been recognized as threatened/endangered by the CNMI Government.

Based on the lack of optimal habitat for this species at Tinian Harbor, a “*no effect*” determination is anticipated.

#### Plants

##### Berenghenas Halomtano (*Solanum guamense*)

Berenghenas Halomtano (*Solanum guamense*) is a small shrub in the nightshade family that is endemic to the Mariana Islands. *S. guamense* may reach a height of 3.2–6.6 feet and is known from limestone cliffs and terraces close to the ocean (Stone 1970). Historically present on Guam, Rota, Saipan, Tinian, Asuncion, Guguan, and Maug, *S. guamense* is currently known from a single individual on Guam (USFWS 2015).

*S. guamense* was federally listed as endangered on 1 October 2015 (USFWS 2015). No critical habitat has been designated for this species. This species has not been recognized as threatened/endangered by the CNMI Government.

Based on the lack of optimal habitat for this species at Tinian Harbor, a “*no effect*” determination is anticipated.

##### *Dendrobium guamense*

*Dendrobium guamense* is an epiphytic orchid historically known from Guam, Rota, Tinian, Saipan, and Agrihan (USFWS 2015). Stems are crowded and can reach 2 feet (Stone 1970). The creamy-white flowers of *D. guamense* only last for a single day (Raulerson and Rinehart 1992). In the 1980s, this species was common in trees on Guam and Rota, with greater than 12 occurrences on Guam and 17 occurrences on Rota (USFWS 2015). Presently, about 1,250 individuals occur among at least 21 known occurrences on Guam (four occurrences totaling less than 250 individuals), Rota (15 occurrences totaling more than 700 individuals), and Tinian (two occurrences with an unknown number of individuals (USFWS 2015).

CNMI-DFW biologists conducted surveys for *D. guamense* on Rota in November 2014 and February 2015. During these surveys, 573 *D. guamense* individuals were counted along 14 of 17 transects surveyed, and nearly 35,000 individuals were estimated to occur in the western region of Rota (Zarones et al. 2015b). On Rota, host trees for *D. guamense* include *Artocarpus altilis*, *Artocarpus mariannensis*, *Elaeocarpus joga*, *Ficus prolixa*, and *Hernandia labyrinthica* (Zarones et al. 2015b). Not previously known from Aguihan, CNMI-DFW biologists recorded three individuals of *D. guamense* on the island in February 2015; two in a *Pouteria obovata* tree and one in a *Terminalia catappa* tree (Zarones et al. 2015a).

*D. guamense* was federally listed as threatened on 1 October 2015 (USFWS 2015). No critical habitat has been designated for this species. This species has not been recognized as threatened/endangered by the CNMI Government.

Based on the lack of optimal habitat for this species at Tinian Harbor, a “no effect” determination is anticipated.

#### *Tuberolabium guamense*

*Tuberolabium guamense* is an epiphytic orchid historically known from Guam, Rota, Tinian, and Aguiguan (USFWS 2015). *T. guamense* is known to flower between September and October, with most plants flowering simultaneously (Raulerson and Rinehart 1992). Presently, one *T. guamense* individual is known to occur on Guam, and ≥239 individuals are known from Rota (USFWS 2015). CNMI-DFW biologists conducted surveys for *T. guamense* on Rota in November 2014 and February 2015. During these surveys, 239 *T. guamense* individuals were counted along six of 18 transects surveyed, and nearly 14,600 individuals were estimated to occur in the western third of Rota (Zarones et al. 2015b). On Rota, host trees for *T. guamense* include *Elaeocarpus joga*, *Hernandia labyrinthica*, and *Premna obtusifolia* (Zarones et al. 2015b).

*T. guamense* was federally listed as threatened on 1 October 2015 (USFWS 2015). No critical habitat has been designated for this species. This species has not been recognized as threatened/endangered by the CNMI Government.

Based on the lack of optimal habitat for this species at Tinian Harbor, a “no effect” determination is anticipated.

#### Ufa-halomtano (*Heritiera longipetiolata*)

Ufa-halomtano (*Heritiera longipetiolata*) is a tree in the hibiscus family, and endemic to the Mariana Islands (Stone 1970, USFWS 2015). *H. longipetiolata* typically occurs in crevices of rough limestone, particularly on cliffs and plateaus, and individuals are often twisted and wind-stunted (Stone 1970, Raulerson and Rinehart 1991). *H. longipetiolata* can reach up to 49 feet in height and can attain a diameter of 39 inches (Kostermans 1959). Ufa-halomtano presently persists in 10 occurrences comprising approximately 200 individuals on Guam, Rota, Tinian, and Saipan (Harrington et al. 2012, USFWS 2015).

*H. longipetiolata* was federally listed as endangered on 1 October 2015 (USFWS 2015). No critical habitat has been designated for this species. This species has not been recognized as threatened/endangered by the CNMI Government.

Based on the lack of optimal habitat for this species at Tinian Harbor, a “no effect” determination is anticipated.

### **Critical Habitat**

Critical habitat has not been designated nor is currently being proposed for the island of Tinian for any listed species under USFWS jurisdiction.

### **B. Marine Fauna and Flora**

The NOAA Pacific Islands Regional Office (Honolulu, HI) listed a total of 39 marine species (or Distinct Population Segments) in the Marianas archipelago; 28 marine mammals; 5 sea turtles, 3 fish and 3 corals (Table 2). There are no species being Proposed for Listing in the Marianas. However, there are several Candidate species going through a status review for consideration in listing. It should be noted that all marine mammals are also protected under the Federal Marine Mammal Protection Act and those species present in the Marianas are also listed in Table 2.

Table 2. Federal and Commonwealth of the Northern Mariana Islands (CNMI) listed threatened/endangered aquatic species that may occur or have historically occurred in the waters of the Mariana archipelago and therefore, Tinian. Protected status information obtained (website accessed August 2017) from [http://www.fpir.noaa.gov/PRD/prd\\_marine\\_protected\\_species\\_of\\_mariana\\_islands\\_list.html](http://www.fpir.noaa.gov/PRD/prd_marine_protected_species_of_mariana_islands_list.html)  
PT = Proposed Threatened, T = Threatened, E = Endangered, NR = Not recognized.

LISTED SPECIES	FEDERAL ESA	CNMI
<b>MARINE MAMMALS</b>		
Blue Whale ( <i>Balaenoptera musculus</i> )	E	NR
Blainville's Beaked Whale ( <i>Mesoplodon densirostris</i> )	E	NR
Bryde's Whale ( <i>Balaenoptera edeni</i> )	NR	NR
Cuvier's Beaked Whale ( <i>Ziphius cavirostris</i> )	NR	NR
Dwarf Sperm Whale ( <i>Kogia simus</i> )	NR	NR
False Killer Whale ( <i>Pseudorca crassidens</i> )	NR	NR
Fin Whale ( <i>Balaenoptera physalus</i> )	E	NR
Humpback Whale ( <i>Megaptera novaeangliae</i> )	E	NR
Killer Whale ( <i>Orcinus orca</i> )	NR	NR
Long-finned Pilot Whale ( <i>Globicephala melaena</i> )	NR	NR
Longman's Beaked Whale ( <i>Indopacetus pacificus</i> )	NR	NR
Melon-Headed Whale ( <i>Peponocephala electra</i> )	NR	NR
Minke Whale ( <i>Balaenoptera acutorostrata</i> )	NR	NR
Pygmy Killer Whale ( <i>Feresa attenuate</i> )	NR	NR
Pygmy Sperm Whale ( <i>Kogia breviceps</i> )	NR	NR
Sei Whale ( <i>Balaenoptera borealis</i> )	E	NR
Short-Finned Pilot Whale ( <i>Globicephala macrorhynchus</i> )	NR	NR
Sperm Whale ( <i>Physeter microcephalus</i> )	E	NR
Bottlenose Dolphin ( <i>Tursiops truncatus</i> )	NR	NR
Common Dolphin ( <i>Delphinus delphis</i> )	NR	NR
Fraser's Dolphin ( <i>Lagenodelphis hosei</i> )	NR	NR
Pantropical Spotted Dolphin ( <i>Stenella attenuate</i> )	NR	NR
Risso's Dolphin ( <i>Grampus griseus</i> )	NR	NR
Rough-toothed Dolphin ( <i>Steno bredanensis</i> )	NR	NR
Spinner Dolphin ( <i>Stenella longirostris</i> )	NR	NR
Striped Dolphin ( <i>Stenella coeruleoalba</i> )	NR	NR
Dugong ( <i>Dugong dugon</i> ) <i>Dugongs are under the jurisdiction of the USFWS.</i>	E	NR
Northern Elephant Seal ( <i>Mirounga angustirostris</i> )	NR	NR
<b>SEATURTLES</b>		
Green Turtle, Central West Pacific DPS ( <i>Chelonia mydas</i> )	E	T/E
Hawksbill Turtle ( <i>Eretmochelys imbricate</i> )	E	T/E
Leatherback Turtle ( <i>Dermochelys coriacea</i> )	E	NR
Loggerhead Turtle, North Pacific DPS ( <i>Caretta caretta</i> )	E	NR
Olive Ridley Turtle ( <i>Lepidochelys olivacea</i> )	T	NR

LISTED SPECIES	FEDERAL ESA	CNMI
<b>FISH</b>		
Scalloped Hammerhead Shark, Indo-West Pacific DPS ( <i>Sphyrna lewini</i> )	T	NR
Giant Manta Ray ( <i>Manta birostris</i> )	PT	NR
Oceanic Whitetip Shark ( <i>Carcharhinus longimanus</i> )	PT	NR
<b>CORALS</b>		
Coral; no common name ( <i>Seriatopora aculeata</i> )	T	NR
Coral; no common name ( <i>Acropora globiceps</i> )	T	NR
Coral; no common name ( <i>Acropora retusa</i> )	T	NR

Though the list of protected marine species shown in Table 2 is extensive, most of the species are pelagic and found offshore and do not occur in the shallow nearshore waters of Tinian. The list of potentially affected species narrows even further when only the Tinian Harbor project site is considered.

The following species summary is provided for each of the federally listed species that are known to occur, or are likely to occur in Tinian Harbor. Based on the species' life history characteristics, habitat requirements, historical knowledge of the project site, the known resources, and the potential impacts from the proposed action, a preliminary effects determination as it pertains to an ESA section 7 consultation was suggested. This does not pre-empt the need for additional resource surveys.

#### Green Sea Turtle (*Chelonia mydas*)

In response to the original decline in population levels, the green turtle was listed as threatened under the Endangered Species Act, except for the Florida and Pacific coast of Mexico breeding populations, which were listed as endangered, on 28 July 1978 (43 FR 32800).

After a thorough 5-year review and reassessment of the worldwide populations of the green turtle, NMFS and USFWS issued a final rule in May 2016 to list 11 distinct population segments (DPSs) of the green sea turtle under the Endangered Species Act. Based on the best available scientific and commercial data, and after considering comments on the proposed rule, it was determined that three DPSs are endangered species and eight DPSs are threatened species (81 FR 20057). The Central West Pacific DPS occurs in the Mariana Islands and is listed as endangered. Critical habitat is currently being investigated with a draft plan expected in 2018.

After leaving the nesting beach, young sea turtles are believed to occupy open ocean pelagic habitat, perhaps associated with sargassum rafts. It is generally assumed that at this life stage they are omnivorous with a strong tendency toward carnivory. An ontogenetic shift from a pelagic life form to benthic foraging occurs after reaching a carapace size of 20-25 cm in the Western Atlantic or 35 cm carapace length in Hawaii and Australia. A change to a herbivorous diet also occurs during this time, primarily sea grasses and algae, although they also consume jellyfish, salps and sponges (Lutz and Musick 1997).

In an assessment of green turtle populations in the southern five islands of the CNMI, Kolinski, et.al. (2004) found that Tinian contained the highest densities of sea turtles, followed by Saipan,

Rota, Aguijan and Farallon de Medinilla. Interestingly, sea turtle densities were not found to be significantly correlated with island and reef perimeters. The near shore sea turtle population around the southern CNMI islands was estimated from 1,000 to 2,000 individuals. Kolinski, et.al. (2004) also noted the predominance of juvenile sea turtles identified from the numerous surveys and suggested further research in tagging and size differentiation be pursued.

Based on local knowledge, green turtles have been observed in Tinian Harbor, therefore a “*may effect*” determination is anticipated.

#### Hawksbill Sea Turtle (*Eretmochelys imbricata*)

Population declines resulted in the hawksbill turtle being listed as endangered on 2 June 1970 (35 FR 8495). Critical habitat was identified by the NMFS on 2 September 1998 (Volume 63, Number 170) as occurring in waters extending seaward 3 nm from the Mean High Water Line of Isla de Mona (Mona Island), and Isla Monito (Monito Island), Puerto Rico. No critical habitat has been designated in the Mariana archipelago.

Hawksbill turtles have a circum-tropical distribution, occurring from 30°N to 30°S latitude within the Atlantic, Pacific, and Indian oceans. Along the eastern Pacific Rim, hawksbills were apparently common to abundant as recently as 50 years ago in near shore waters from Mexico to Ecuador, particular the east coast of Baja California Sur near Concepcion Bay and Paz Bay, Mexico.

What appears to be a better situation occurs in the Central Pacific; nesting is widely distributed and in very low numbers. Foraging hawksbills are observed from virtually all the island groups in Oceania, from the Galapagos Islands in the eastern Pacific to the Republic of Palau in the Western Pacific. Hawksbills nest on the islands and mainland of Southeast Asia, from China and Japan, throughout the Philippines, Malaysia, and Indonesia, to Papua New Guinea, the Solomon Islands and Australia (USFWS 1998).

As with other sea turtle species, after leaving the nest the turtle is pelagic. Data indicates that Hawksbills forage most often over coral reef areas and rock outcroppings although they also feed in seagrass meadows in mangrove-fringed bays. Although generally accepted that hawksbill sea turtles are primarily spongivores, other items consumed include: sea grasses, tunicates, bryozoans, coelenterates, molluscs and soft corals. Hawksbills are believed to undergo a period of omnivorous feeding in benthic habitats prior to adopting the specialized spongivory known from larger juveniles and adults (Lutz and Musick 1997).

Although the *Recovery Plan for the U.S. Pacific Populations of the Hawksbill Turtle*(USFWS 1998) reports no nesting of hawksbill turtles in the Northern Mariana Islands, recent nesting evidence on Rota and Saipan supports their inclusion into the USFWS jurisdictional listing (USFWS-Part III, 1996). Additionally, Resources Northwest Consultants (1998) reports that hawksbill turtles are believed to have historically nested on at least six of Rota’s beaches: Talakhaya, Two Brother’s Point, Mochong, Lalayak, Coconut Village, Teteto and the adjacent Santa Margarita Beaches. However, they have not been seen for “*approximately the last ten years*”.

Although hawksbill turtles are much less abundant than the green turtle in the nearshore waters, a “*may effect*” determination would also likely be appropriate for the hawksbill turtle.

Coral (*Acropora globiceps*)

NOAA listed this coral species as threatened on 10 October 2014. Although presently under development, no critical habitat has been designated at this point in time. The following species account was taken directly from the NOAA website<sup>5</sup>.

*Colonies of Acropora globiceps have finger-like branches. The size and appearance of branches depend on degree of exposure to wave action but are always closely compacted. Colonies exposed to strong wave action have pyramid-shaped branchlets. Colonies can be uniform blue (which may photograph purple) or cream, brown, or fluorescent green in color.*

*Acropora globiceps is a hermaphroditic (having both male and female gametes) spawner with lecithotrophic (yolk-sac) larvae.*

*Based on confirmed observations and strong predictions of occurrence in areas that have not yet been surveyed sufficiently, Acropora globiceps is likely distributed from the oceanic west Pacific to the central Pacific as far east as Pitcairn Islands.*

*Based on the information below we consider Acropora globiceps to occur in Guam, the Commonwealth of the Northern Mariana Islands (CNMI), American Samoa, and the Pacific Remote Island Areas (PRIA).*

*Doug Fenner has a photo from CNMI that shows this species clearly. Veron (2014) lists this species in the “Marianas” but is not specific about whether it is in Guam and/or CNMI. Randall (1995; 2003) does not list it in Guam or CNMI, nor does Burdick (2014), but Randall and Burdick (in preparation) list it from the Mariana Islands, but it is not clear if they list it from CNMI. Brainard et al. (2011) indicate that it has been reported from the “Northern Marianas Islands” by the IUCN Red List. The IUCN Red List indicates it is known from the “Northern Mariana Islands,” but does not give the source.*

*Acropora globiceps occurs on upper reef slopes, reef flats, and adjacent habitats in depths ranging from 0 to 8 meters.*

*Relative localized abundance refers to how commonly a species is observed on surveys in a localized area. Veron (2014) reports that Acropora globiceps occurred in 3.2 percent of 2,984 dive sites sampled in 30 ecoregions of the Indo-Pacific. It was given an abundance rating on a scale of 1 (low) to 5 (high) at each site where it occurred, based on how common it was at that site. Acropora globiceps had a mean abundance rating of 1.95. Based on this semi-quantitative system, the species’ abundance was characterized as “uncommon.”*

*Absolute overall abundance refers to a rough qualitative minimum estimate of the total number of colonies of a species that currently exist throughout its range. These estimates were calculated based on results from Richards et al. (2008) and Veron (2014). The absolute abundance of Acropora globiceps is likely at least tens of millions of colonies.*

*Acropora globiceps is susceptible to the three major threats identified for corals including ocean warming, disease, and ocean acidification, as well as many of the other threats to corals. Despite its distribution from southeast Asia to the central Pacific, Acropora globiceps occurs primarily in a limited depth range of 0 to 8 meters. Shallow reef areas can be physically diverse and complex, but are often subjected to frequent changes in environmental conditions, extremes, high*

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<sup>5</sup> [http://www.fpir.noaa.gov/Graphics/PRD/Coral/Acropora\\_globiceps.pdf](http://www.fpir.noaa.gov/Graphics/PRD/Coral/Acropora_globiceps.pdf)



*irradiance, and simultaneous effects from multiple stressors, both local and global in nature. Future projections of climate change impacts to coral reef environments indicate that a shallow depth range, in combination with its other biological, demographic, and spatial characteristics, contributes to a risk of extinction within the foreseeable future for Acropora globiceps.*

In their review of the proposed Master plan, the USFWS (via letter dated 7 September 2017) identified *Acropora globiceps* as occurring within Tinian Harbor. Therefore, a “may affect” determination would be appropriate. Additional quantitative surveys that would be conducted for the Biological Assessment will determine whether the proposed action is likely to adversely affect this species.

#### Coral (*Seriatopora aculeata*)

NOAA listed this coral species as threatened on 10 October 2014. Although presently under investigation, no critical habitat has been designated at this point in time. The following species account was taken directly from the NOAA website<sup>6</sup>:

*Colonies of Seriatopora aculeata have pencil-thick, short, tapered branches, usually in fused clumps. Colonies are pink or cream in color. The reproductive characteristics of Seriatopora aculeata have not been determined, but other species of Seriatopora are hermaphroditic (having both male and female gametes) brooders (expelling sperm but egg fertilization is internal).*

*Based on confirmed observations and strong predictions of occurrence in areas that have not yet been surveyed sufficiently, Seriatopora aculeata is likely distributed mostly within the Coral Triangle area (the Philippines to Timor Leste and east to the Solomon Islands), as well as adjacent areas in the western Pacific from the Mariana Islands down to New Caledonia.*

*Seriatopora aculeata has not yet been reported from American Samoa and the Pacific Remote Island Areas (PRIA). Based on the information below we consider Seriatopora aculeata to occur in Guam and the Commonwealth of the Northern Mariana Islands (CNMI).*

*Randall (1995; 2003) reports it from the Marianas archipelago but does not distinguish Guam from CNMI. Veron (2014) reports it from the “Marianas” but does not distinguish Guam from CNMI. Brainard et al. (2011) write that the IUCN Red List reported it from the “Northern Marianas Islands” but the source was not reported. Houk (P. Houk, pers. comm., 2014) reports that S. aculeata is common around Saipan.*

*Seriatopora aculeata occurs in a broad range of habitats on the reef slope and back-reef, including but not limited to upper reef slopes, mid-slope terraces, lower reef slopes, reef flats, and lagoons in a depth range of 3 to 40 meters.*

*Seriatopora aculeata is susceptible to the three major threats identified for corals including ocean warming, disease, and ocean acidification, as well as many of the other threats to corals. A significant proportion of its current known geographic range is within the Coral Triangle area. This area is projected to have the most rapid and severe impacts from climate change and localized human impacts for coral reefs over the 21st century. Multiple ocean warming events have already occurred within the western equatorial Pacific (which includes the Coral Triangle area) that suggest future ocean warming events may be more severe than average in this part of the world. A range constrained mostly to this particular geographic area that is likely to experience severe and increasing threats indicates that a high proportion of the population of this species is likely to*

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<sup>6</sup> [http://www.fpir.noaa.gov/Graphics/PRD/Coral/Seriatopora\\_aculeata.pdf](http://www.fpir.noaa.gov/Graphics/PRD/Coral/Seriatopora_aculeata.pdf)

be exposed to those threats over the foreseeable future. This, in combination with its other biological, demographic, and spatial characteristics, contributes to a risk of extinction within the foreseeable future for *Seriatopora aculeata*.

Due to the dearth of knowledge on the distribution of this coral species, specific surveys will have to be conducted prior to making an effect determination.

### **Critical Habitat**

As of the date of this document, critical habitat has not been designated nor is currently being proposed in CNMI waters for any listed species under NMFS jurisdiction. However, identification of critical habitat in the Marianas for the listed coral species and the green sea turtle is currently under development. Critical Habitat for these species may be proposed as early as late 2018.

### **III. Initial Agency Coordination**

The following federal and CNMI agencies were requested to provide comments on the proposed action relative to their agencies mandate: U.S. Fish and Wildlife Service (email dated 6 July 2017); National Marine Fisheries Service (letter received 7 July 2017); U.S. Army Corps of Engineers (email dated 6 July 2017); Division of Coastal Resources Management (letter received 3 July 2017); Division of Environmental Quality (letter received 3 July 2017); Division of Fish and Wildlife (letter received 3 July 2017); Division of Historic Preservation (letter received 7 July 2017). Agency responses are included in Appendix 1.

#### **A. Federal Agencies**

##### **1. U.S. Fish and Wildlife Service**

The USFWS reviewed the draft harbor master plan and submitted their preliminary comments in a letter dated 7 September 2017. The following bullet points highlights their comments:

- the required USACOE permit would require, at a minimum, consultations under section 7 of the ESA and FWCA, compliance with the federal action agency's guidelines under NEPA, as well as other environmental statutes;
- biological surveys were first conducted by the USFWS in 2008 and more recently in May 2016 for the USACOE Tinian Harbor Feasibility Study for harbor improvements with the draft report being released in October 2017;
- a programmatic EIS should be considered for the proposed action;
- the federally threatened coral *Acropora globiceps* was documented within Tinian Harbor;
- the seagrass (*Halophila* sp.) was documented from Tinian Harbor;
- development of a compensatory mitigation plan was suggested to mitigate the unavoidable impacts to corals, seagrasses, and macro-algae;
- a risk assessment study should be developed to address the potential increased risk of invasive species; and
- because the DoD claimed in the draft CJMT EIS that the facilities of Tinian Harbor were adequate for the military's purpose, the CNMI Government should request that the CJMT NEPA process include the proposed action.

##### **2. National Marine Fisheries Service**

The USFWS reviewed the draft harbor Master Plan and submitted their preliminary comments in a letter dated 3 August 2017. The following bullet points highlights their comments:

- Due to the U.S. Army Corps of Engineers requiring a R&HA section 10/CWA section 404 permit, implementation of the proposed action would require consultation under

- section 7 of the ESA, compliance with the federal action agency's guidelines under NEPA, consultation as required by the FWCA and MSA Essential Fish Habitat;
- a comprehensive environmental planning document that includes quantitative marine resource assessments and an assessment of runoff and stormwater, spills, invasive species, marine debris, sedimentation and turbidity, noise impacts, and the direct loss of habitat associated with the wharf and pier faces consisting predominately of complex multi-species assemblages of coral growing on existing wharf and pier surfaces.
- development of a Stormwater Pollution Prevention Plan, a Biosecurity Plan, and a Spill Prevention, Control and Countermeasure Plan;

### **3. U.S. Army Corps of Engineers**

The USACOE reviewed the draft harbor Master Plan and submitted their preliminary comments in a letter dated 2 November 2017. The following bullet points highlights their comments:

- the proposed Tinian Harbor expansion plans, as contained in the Master Plan, has been assigned a Department of Army reference number POH-2017-231;
- the purpose of their comments was to provide information regarding the USACOE regulatory program and permit requirements; the USACOE suggested that the proposed action will require some form of a R&HA section 10 and CWA section 404 permit that must comply with the section 404(b)(1) Guidelines.
- for unavoidable impacts to marine resources, compliance with the Federal Compensatory Mitigation for Losses of Aquatic Resources will be required;
- implementation of the proposed action would require consultation under section 7 of the ESA, section 106 of the NHPA, section 307 of the Coastal Zone Management Act, CWA section 401, and MSA Essential Fish Habitat.

## **B. CNMI Agencies**

### **1. Division of Coastal Resources Management**

The DCRM reviewed the draft harbor Master Plan and submitted their preliminary comments in a letter dated 3 August 2017. The following bullet points highlights their comments:

- the proposed action falls within the Port and Industrial, Coastal Hazards, and Lagoon and Reef Areas of Particular Concern;
- implementing the action will require, at a minimum, a Water Quality Certification and compliance with relevant management standards and use priorities of APC's as well as a Major Siting Permit;
- anticipated impacts to resources under DCRM management authority may include; increase in risk of fuel spills, and significant impacts to water quality, marine species and habitat and public access, particularly during dredging operations and historic properties, such as the near-by House of Taga;

### **2. Division of Environmental Quality**

The DEQ reviewed the draft harbor Master Plan and submitted their preliminary comments in an email dated 2 August 2017. The following bullet points highlights their comments:

- the proposed action will require an Earthmoving and Erosion Control Permit;
- with respect to the solid waste debris generated from demolition activities, the environmental document will have to address what will be reused, what will be disposed and where will it be disposed;
- how and where will the dredged material be disposed;
- the proposed action will require a Water Quality Certification and U.S. Army Corp of Engineers permit.

#### **IV. Potential Impacts to Important Natural Resources**

Six special aquatic sites are identified in the CWA section 404(b)(1) Guidelines that require special consideration and mitigation prior to being impacted by dredge and fill activities: sanctuaries and refuges, wetlands, mud flats, vegetated shallows, coral reefs, and riffle and pool complexes.

Unavoidable project related impacts to these habitats will need to address the requirements outlined in the 2008 Federal Compensatory Mitigation for Losses of Aquatic Resources regulations as jointly promulgated by the USEPA and USACOE. Sanctuaries/refuges, seagrasses, and coral reefs occur in the vicinity of the Tinian Harbor. Further surveys will have to be conducted to determine the magnitude of impact to these resources.

##### Sanctuaries and Refuges

The Tinian Marine Reserve was established by Public Laws 15-90 and 17-14 and lies between Tinian Harbor and South Carolinas Point and extending seaward 0.5 miles.

##### Vegetated Shallows

Tsuda, et.al. (1977) listed three species of seagrasses that are known from the CNMI; *Enhalus acoroides*, *Halophila minor*, and *Halodule uninervis*. A fourth species of sea grass, *Halophila ovalis*, was recently discovered during a sea turtle assessment study on Saipan (Kolinski, et.al., 2001). Only three islands in the CNMI are known to have seagrasses; Saipan, Tinian and Rota.

Tinian seagrass resources are very limited. Small beds of *Enhalus acoroides* have been noted at the Unai Chiget embayment by: Eldredge and Randall (1980); Kolinski, et.al. (2004); Fosberg et.al. (1987) and Tsuda and Kamura (1990). *Halophila minor* has been documented in Tinian Harbor area by Jones et.al. (1974), Maragos (1985) and Tsuda and Kamura (1990). In their recent harbor studies, the USFWS found seagrasses (*Halophila* sp.) “moderately abundant in some areas.”

##### Coral Reefs

Coral reefs are typically considered to be any coral growth by the regulatory agencies. Coral growth occurs on harbor bulkheads and other manmade substrates, as well as in scattered patches within the harbor proper that includes the areas proposed for dredging.

Dredging activities will likely require the development of a compensatory mitigation plan to address the unavoidable impacts to the seagrasses, and coral growth. Mitigation could include on-site in-kind coral transplantation that would include 5 years of monitoring and the meeting of performance standards.

Table 3 provides an overview of impacts to marine resources by project component.

Table 3. Potential project related impacts to natural resources.

PROPOSED ACTION	ANTICIPATED MAGNITUDE OF IMPACT TO NATURAL RESOURCES
<p>Installation of new bollards and berthing fenders along North Quay dock face. Supply new cargo hose to extend tanker berth range.</p>	<p><b>Minor</b>                      No significant impacts expected to marine environment.                       Likely insignificant modifications to Tinian Harbor which is eligible as a historic district under criteria A and C.</p>
<p>Repair wharf cap and bull rail at berth 1 and 3</p>	<p><b>Minor</b>                      No significant impacts expected to marine environments.                       Likely insignificant modifications to Tinian Harbor which is eligible as a historic district under criteria A and C.</p>
<p>Demolish and dredge Finger Pier A and construction of revetted slope structure (e.g., fill).</p>	<p><b>Major</b>                      Significant modification to Tinian Harbor which is eligible as a historic district under criteria A and C.                       Significant adverse impact to non-motile and slow moving benthic resources living in immediate vicinity of Finger Pier A.                       Generation of turbidity plumes during dredge and fill activities.                       Potential “<i>may effect</i>” to listed federal T&amp;E species.</p>
<p>Dredging of Tinian Harbor</p>	<p><b>Major</b>                      Proposed 250,00 cy for maintenance dredging and 50,000 cy for new dredging                       Generation of sediment plumes during dredging activities.                       Significant adverse impact to non-motile and slow moving benthic resources within the dredge footprint.                       Potential “<i>may effect</i>” to listed federal T&amp;E species.</p>
<p>Fill to create additional dock area</p>	<p><b>Major</b>                      Significant modification to Tinian Harbor structures that are eligible as a historic district under criteria A and C.                       Generation of turbidity plumes during fill activities.                       Significant adverse impact to non-motile and slow moving benthic resources within the footprint of the fill material.                       Potential “<i>may effect</i>” to listed federal T&amp;E species.</p>

## V. Environmental Mitigation

The generally accepted approach in applying mitigation for actions in aquatic environments follows the policy developed by the USACOE and the USEPA (see 1990 Memorandum of Agreement). The three types of mitigation shown below are typically followed in the order presented:

*(1) Avoidance means mitigating an aquatic resource impact by selecting the least-damaging project type, spatial location and extent compatible with achieving the purpose of the project. Avoidance is achieved through an analysis of appropriate and practicable alternatives and a consideration of impact footprint.*

*(2) Minimization means mitigating an aquatic resource impact by managing the severity of a project's impact on resources at the selected site. Minimization is achieved through the incorporation of appropriate and practicable design and risk avoidance measures.*

*(3) Compensatory Mitigation means mitigating an aquatic resource impact by replacing or providing substitute aquatic resources for impacts that remain after avoidance and minimization measures have been applied, and is achieved through appropriate and practicable restoration, establishment, enhancement, and/or preservation of aquatic resource functions and services.*

Avoiding impacts to marine resources starts during the project design phase where engineers attempt to adopt the least environmentally damaging structures (or designs) that would still accomplish the stated objectives. For example, instead of constructing solid causeways out into harbor waters to moor vessels, elevated piers would be designed to meet the vessel mooring demand.

As the Master Plan goes through the NEPA review process, avoidance and minimization measures will be identified based on the type and magnitude of impacts to aquatic resources. This process will also explore several alternatives of meeting the same objectives, through slightly different approaches and each alternative will be analyzed against the other. The preferred alternative is typically selected when mitigation measures are able to minimize the sum total of impacts to the marine resources. Unavoidable impacts to marine resources will require development of a compensatory mitigation plan that would follow the 2008 Federal Compensatory Mitigation for Losses of Aquatic Resources regulations.

Development of mitigation measures prior to a NEPA analysis is preliminary, however there are several agencies that have previously developed mitigation measures that can be applied to all issued permits. The most extensive list of mitigation measures was developed by the USACOE and will be used as a planning guide for purposes of this Master Plan.

The following BMP's and general conditions measures are typically included on USACOE permits issued in the Western Pacific under the Western Pacific Standard Local Operating Procedures for Endangered Species (Pac-SLOPES). Although presented in no particular order, similar measures are grouped together. Not all BMP's or mitigation measures may be applicable to the in-water activities being proposed by the Tinian Harbor Master Plan.

Typical mitigation measures that are expected to be included on any USACOE permit.

- Each permit will contain the requirement that the permittee document and report to the Corps and NMFS, all interactions with listed species, including the disposition of any listed

species that are injured or killed. Should an ESA-listed species be adversely affected, all work must stop pending re-initiation and completion of consultation between the Corps and NMFS Protected Resources Division for that action.

- Projects that would affect structures or substrate with ESA-listed corals attached are excluded from coverage under Pac-SLOPES.
  - For in-water work where ESA corals may occur, structures and substrate that could be affected by the proposed activity must be surveyed by personnel qualified to identify ESA-listed corals.
  - Should ESA-listed corals be present in the project area, but not on the structures or substrate that would be directly impacted by the activity, that activity may be covered under Pac-SLOPES if the activity complies with the conditions and best management practices described in this biological evaluation.
  - To minimize impacts to coral larvae, notably the listed species covered in this programmatic consultation, the permittee shall avoid in-water work during mass-coral spawning times or peak coral spawning seasons. Permittees must consult with local biologists (either NMFS Habitat Conservation Division representatives in their respective locations, or the appropriate local government agencies) to determine the exact period and dates when coral spawning would occur for the given year.
- Constant vigilance shall be kept for the presence of non-coral ESA-listed marine species (sea turtles, marine mammals, sharks) during all aspects of the permitted action.
  - A responsible party, i.e., permittee/site manager/project supervisor, shall designate a competent observer to search/monitor work sites and the areas adjacent to the authorized work area for ESA-listed marine species;
  - Searches and monitoring shall be made prior to the start of work each day, including prior to resumption of work following any break of more than one-half hour. Additional periodic searches and monitoring throughout the work day are strongly recommended;
  - All in-water work will be postponed or halted when ESA-listed marine species are within 50 yards of the proposed work, and will only begin/resume after the animals have voluntarily departed the area, with the following exception: if ESA-listed marine species are noticed within 50 yards after work has already begun, that work may continue only if, in the best judgment of a biologist, the activity is unlikely disturb or harm the animal(s), for example, divers performing surveys or underwater work (excluding the use of toxic chemicals) is likely safe, the use of heavy machinery is not; and
  - Project-related personnel shall NOT attempt to disturb, touch, ride, feed, or otherwise intentionally interact with any protected species.
- Project footprints must be limited to the minimum area necessary to complete the project.
- The project area must be flagged to identify and avoid impacts to sensitive resource areas, such as corals, seagrass beds, listed terrestrial plants, and sea turtle nests.
- Work located channel ward of the Mean Higher High Tide Line of navigable water or channel ward of the upward limits of adjacent wetlands must be timed to minimize effects on ESA-listed species and their habitats.
- Project operations must cease under unusual conditions, such as large tidal events and high surf conditions, except for efforts to avoid or minimize resource damage.
- A storm water management plan, commensurate to the size of the project, must be prepared and carried out for any project that will produce any new impervious surface or a land cover conversion that will slow the entry of water into the soil to ensure that effects to water quality and hydrology are minimized.

- A pollution and erosion control plan for the project site and adjacent areas must be prepared and carried out. As a minimum, this plan shall include:
  - Proper installation and maintenance of silt fences/curtains, saucages, equipment diapers, or drip pans.
  - A contingency plan to control and clean spilled petroleum products and other toxic materials.
  - Appropriate materials to contain and clean potential spills will be stored at the work site, and be readily available.
  - All project-related materials and equipment placed in the water will be free of pollutants.
  - Daily pre-work inspections of heavy equipment for cleanliness and leaks, with all heavy equipment operations postponed or halted until leaks are repaired and equipment is cleaned.
  - Fueling of project-related vehicles and equipment will take place at least 50 feet away from the water and within a containment area, preferably over an impervious surface;
  - A plan will be developed to prevent trash and debris from entering the marine environment during the project.
  - All construction discharge water (e.g., concrete washout, pumping for work area isolation, vehicle wash water, drilling fluids) must be treated before discharge.
- Erosion controls must be properly installed before any alteration of the project area may take place.
- Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.
- Native species suitable for the impacted habitat must be considered for re-vegetation for the purposes of restoring areas temporarily disturbed by the authorized work to their pre-disturbance condition.
- All disturbed areas must be immediately stabilized following cessation of activities for any break in work longer than 4 days.
- Drilling and dredging are restricted to uncontaminated areas, and any associated waste or spoils must be completely isolated and disposed of in an approved upland disposal location.
- You must remain vigilant for the presence of non-coral ESA-listed marine species (sea turtles, marine mammals, sharks) during all aspects of the permitted action.
- A responsible party, i.e., permittee/site manager/project supervisor, shall designate a competent observer to search/monitor work sites and the areas adjacent to the authorized work area for ESA-listed marine species;
- Searches and monitoring shall be made prior to the start of work each day, including prior to resumption of work following any break of more than one-half hour. Additional periodic searches and monitoring throughout the work day are strongly recommended;
- Equipment operators shall employ “soft starts” when initiating work each day and after each break of 30 minutes or more that directly impacts the bottom. Buckets and other equipment shall be sent to the bottom in a slow and controlled manner for the first several cycles before achieving full operational impact strength or tempo;
- Project-related personnel shall NOT attempt to disturb, touch, ride, feed, or otherwise intentionally interact with any protected species.
- Project footprints must be limited to the minimum area necessary to complete the project.
- A plan will be developed to prevent trash and debris from entering the marine environment during the project.



- Mooring systems shall employ the minimum line length necessary to account for expected fluctuations in water depth due to tides and waves.
- Mooring systems shall be designed to keep the line as tight as possible, with the intent to eliminate the potential for loops to form.
- Mooring lines shall consist of a single line. No additional lines or material capable of entangling marine life may be attached to the mooring line or to any other part of the deployed system.
- Mooring systems shall be designed to keep the gear off the bottom, by use of a mid-line float when appropriate, with the intent to eliminate scouring of corals or entanglement of the line on the substrate.

Best Management Practices as required by the Western Pacific Standard Local Operating Procedures for Endangered Species.

BMPs required for activity types that may result in collision with vessels:

- Vessel operators shall alter course to remain at least 100 yards from whales, and at least 50 yards from other marine mammals and sea turtles.
- Vessel operators shall reduce vessel speed to 10 knots or less when piloting vessels in the proximity of marine mammals, and to 5 knots or less when piloting vessels in areas of known or suspected turtle activity.
- If approached by a marine mammal or turtle, the vessel operator shall put the engine in neutral and allow the animal to pass.
- Vessel operators shall not encircle or trap marine mammals or sea turtles between multiple vessels or between vessels and the shore.

BMPs required for activity types that may result in direct physical impact:

- Before any equipment, anchor(s), or material enters the water, a responsible party, i.e., permittee/site manager/project supervisor, shall verify that no ESA-listed species are in the area where the equipment, anchor(s), or materials are expected to contact the substrate. If practicable, the use of divers to visually confirm that the area is clear is preferred.
- Equipment operators shall employ “soft starts” when initiating work each day and after each break of 30 minutes or more that directly impacts the bottom. Buckets and other equipment shall be sent to the bottom in a slow and controlled manner for the first several cycles before achieving full operational impact strength or tempo.
- All objects lowered to the bottom shall be lowered in a controlled manner. This can be achieved by the use of buoyancy controls such as lift bags, or the use of cranes, winches, or other equipment that affect positive control over the rate of descent.
- Equipment, anchor(s), or materials shall not be deployed in areas containing live corals, sea grass beds, or other significant resources.

BMPs required for activity types that may result in entanglement:

- Mooring systems shall employ the minimum line length necessary to account for expected fluctuations in water depth due to tides and waves.
- Mooring systems shall be designed to keep the line as tight as possible, with the intent to eliminate the potential for loops to form.
- Mooring lines shall consist of a single line. No additional lines or material capable of entangling marine life may be attached to the mooring line or to any other part of the deployed system.

- Mooring systems shall be designed to keep the gear off the bottom, by use of a mid-line float when appropriate, with the intent to eliminate scouring of corals or entanglement of the line on the substrate.
- Any permanent or long-term deployments shall include an inspection and maintenance program to reduce the likelihood of failures that may result in loose mooring lines lying on the substrate or hanging below a drifting buoy.
- Mooring systems, including those used for temporary markers, scientific sensor buoys, or vessel moorings, shall be completely removed from the marine environment immediately at the completion of the authorized work or the end of the mooring's service life. The only exceptions to this rule shall be mooring anchors such as eyebolts that are epoxied into the substrate and which pose little or no risk to marine life.

BMPs required for activities that may result in exposure to elevated noise levels:

- For any equipment used in undertaking the authorized work (i.e. dredging, minor excavation) a mandatory shut-down range of 50 m will ensure that no ESA-listed marine animals are exposed to sound levels anywhere near the TTS threshold isopleths.
- Maintenance dredging, in-water excavation, movement of large armor stones, and benthic core sampling shall not be undertaken if any ESA-listed species is within 50 yards of the authorized work, and those operations shall immediately shut-down if an ESA-listed species enters within 50 yards of the authorized work.

Marina or Harbor Repair and Improvement Activities:

- No installation or proofing of steel or concrete pilings and/or sheet pile via impact hammer is authorized.
- Replacement decking should be designed to reduce in-water shading to the greatest extent practicable.
- Repair and removal work will be accomplished in a manner that minimizes the potential spread of invasive species that may reside on the pilings such as immediate removal from the water upon extraction or other appropriate approved containment methods.
- Removed materials must be disposed of at an approved upland disposal site.

Piling Installation, Repair, Replacement and/or Removal:

- Repair and removal work will be accomplished in a manner that minimizes the potential spread of invasive species that may reside on the pilings such as immediate removal from the water upon extraction or other appropriate approved containment methods.
- Removed pilings must be disposed of at an approved upland disposal site.
- No installation or proofing of steel or concrete pilings and/or sheet pile via impact hammer is authorized.

Maintenance Dredging:

- With the exception of the actual dredging apparatus (e.g. clamshell buckets, or the scoop and articulated arm of a backhoe, hydraulic head, etc.), heavy equipment will be operated from above and out of the water.
- Use of hydraulic dredging must include the installation of excluder devices adequate to prevent the entrainment or impingement of protected marine species such as sea turtles and juvenile scalloped hammerhead sharks.
- The applicant will not use a Trailing Suction Hopper Dredge (or hopper dredge) to conduct dredges. There have been numerous observed mortalities of sea turtles and sharks associated with these vessels.

- The applicant will not use Dustpan dredges, which use high velocity water jets to loosen material before sucking it into their apparatus. This technique causes high turbidity and the effects of water velocities from water jets to listed species have not been evaluated.
- The applicant may use cutter head dredges that are equipped with suction heads of 36 inches diameter or less, and a maximum intake velocity of 4.6 meters per second (15 feet per second), and an intake velocity of 95 cm per second (3.1 feet per second) at 1 meter away from the suction head.
- The applicant may use pipeline dredges with openings no larger than 36 inches diameter, and intake velocities of 4.6 meters at the source and 95 cm per second at 1 meter. To avoid lethal entrainment or dismemberment of sea turtles, hammerhead sharks, or marine mammals, suction head openings larger than 12 inches must be either screened with 2-inch mesh or less, operated or monitored by a diver, or behind a barrier (e.g., coffer dams or silt curtains).
- To minimize exposure to listed animals in the water column, the applicant will avoid moving the suction head through the water column while the pump is turned on. The applicant will turn on suction only when the suction heads are at the bottom and in contact with the sediment, and turn it off before lifting the suction head up to the surface.
- In known scalloped hammerhead shark nursery areas, the applicant will conduct all suction dredging behind barriers (e.g., coffer dams or silt curtains), or with a diver operating or monitoring the suction head and screening.
- The portions of the equipment that enter the water will be clean and free of pollutants;
- Appropriate silt containment devices must be used and properly installed to avoid degradation of adjacent coral reefs, and aquatic vegetation.
- Dredged material must be deposited at upland sites, or at EPA designated ocean disposal sites provided sediment standards are met.

Other Minor Discharges and Dredging/Excavations:

- The dredged or discharged material will be free of contamination.
- The site of excavation or discharge will contain no known forage or resting habitat for ESA-listed marine species.

The section 401 Water Quality Certification (401 WQC) is the CNMI permit that is required to validate Rivers & Harbors Act section 10 or Clean Water Act section 404 permits. As appropriately named, the section 401 WQC focuses on ensuring in-water construction activities do not violate established CNMI water quality standards. An approved Environmental Protection Plan is required for the issuance of a section 401 WQC that includes a water quality monitoring plan that monitors turbidity levels outside of an approved mixing zone established by the DEQ. The actual monitoring plan is developed in concert with DEQ staff and based on the proposed work and physical environment where the work would occur. Mitigation measures associated with this permit are typically tailored to the in-water work being proposed.

**VI. Permitting, Mitigation Cost Estimates, and Schedule**

Table 4 provide an overview of required permits, anticipated level of difficulty, estimated costs and estimated costs for post-permit compliance with permit conditions. This does not include costs for the NEPA analyses and assumes the master plan will be implemented at one time.

Compliance with NEPA was not included in the itemized costs analysis as it is dependent upon several variables that strongly influence costs: whether the master plan will be implemented by phase, if an EA or EIS would be pursued, and the NEPA requirements of the Federal action

agency. If the entire Master Plan would go through the NEPA process at one time, it is estimated that costs could range from \$95K to \$200K.

Table 5 provides an estimated time line for compliance with the environmental regulatory requirements for the proposed action. This time line includes NEPA, which forms the basis for all the subsequent regulatory permits.

Table 4. Overview of relevant Federal and local environmental permits, anticipated level of difficulty, estimated costs for permitting and for post-permit issuance mitigation.

PERMIT or AUTHORIZATION	Level of Investigations	Anticipated Level of Difficulty	Estimated Permitting/Survey Costs	Estimated Cost for Post-permit Issuance Mitigation
<b>Federal Permits</b>				
USEPA CWA Section 402 NPDES Construction General Permit NOI	NOI	Low	\$20K	n/a
USCOE Section 10/404 permit	Biological Assessment that would address ESA and EFH issues <i>Assuming formal section 7 consultation</i>	High	\$65K	\$75K
	Archeological Report for NHPA section 106 review	Medium	\$40K	\$20K
	Testing of dredge material for contaminants that would be used for fill material <i>Assuming contaminants are found in harbor sediments</i>	Medium	\$45K	\$100K
	Survey for Unexploded ordinance <i>Assuming Unexploded ordinance is found</i>	High	\$80K	\$80K
<b>CNMI Permits</b>				
DCRM Coastal Resources Management	Major Siting Permit	High	\$85K	\$25K
	Federal Consistency	Low	\$15K	n/a
DEQ Earthmoving & Erosion Control Permit	Individual permit	Medium	\$20K	n/a
DEQ Clean Water Act; Section 401 Water Quality Certification	Individual authorization	Medium	\$20K	\$35K

Table 5. Estimated time line for permitting efforts for the Tinian Harbor Master, including NEPA; it is assumed that design plans are at a minimum 75% complete and ready for initial agency review at start of month one. The time includes data collection, agency coordination, public hearings, and finalization of permit or document.

PERMIT or AUTHORIZATION		TIME IN MONTHS																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
NEPA	EA Option	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█								
	EIS Option	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█			
USACOE Section 10/404 Permit	Biological Assessment & ESA section 7 consultation		█	█	█	█	█	█	█	█	█	█	█	█											
	Archeological Report and NHPA section 106 review		█	█	█	█	█	█																	
	MSA Essential Fish Habitat review			█	█	█	█	█																	
	Fish and Wildlife Coordination Act review			█	█	█																			
	Testing of harbor sediments for contaminants			█	█	█	█	█	█	█	█														
	UXO Survey			█	█	█	█	█																	
USEPA Section 402 NPDES NOI								█	█																
DCRM	Major Siting Permit Option		█	█	█	█	█	█	█																
	Federal Consistency Option													█	█							█	█		
DEQ EM&EC Permit								█	█	█	█														
DEQ CWA Section 401 WQC											█	█	█												

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# **APPENDIX 1**

**TINIAN HARBOR MASTER PLAN – FEDERAL AND CNMI AGENCY COMMENTS**



# United States Department of the Interior



## FISH AND WILDLIFE SERVICE

Pacific Islands Fish and Wildlife Office  
300 Ala Moana Boulevard, Room 3-122  
Honolulu, Hawaii 96850

In Reply Refer To:  
01EPIF00-2017-TA-0319

John Gourley  
Micronesian Environmental Services  
P.O. Box 502802  
Saipan, MP, 96950

SEP 07 2017

Subject: Technical Assistance for the Proposed Tinian Harbor Master Plan

Dear Mr. Gourley:

The U.S. Fish and Wildlife Service (Service) received your notice on July 6, 2017, requesting our review of the Commonwealth of the Northern Mariana Islands Port's Authority (CPA) proposed Tinian Harbor Master Plan project at San Jose, Tinian. The CPA is currently updating the Tinian Harbor Master Plan to bring the port up to seismic and safety standards as well as expand the port for anticipated increased traffic brought on by proposed military and commercial development and is requesting review of the preliminary modifications and their potential impacts. The following are the Services comments on the materials submitted for the proposed project:

- No funding sources have been identified but it is assumed that some funds, if not all, would come from the U.S. Federal government. A Department of Army Permit would require consultations with the USFWS under the Endangered Species Act (ESA), National Environmental Policy Act (NEPA), the Fish and Wildlife Coordination Act (FWCA), and others.
- Our office (Ecological Services) has previously completed biological surveys in Tinian harbor. The first surveys were under the Sikes Act for planned Department of Defense (DoD) activities in 2008 (Minton et al 2009) and more recently in May 2016 for the U.S. Army Corps of Engineers' (USACE) Feasibility Study for harbor improvements (Montgomery 2017). The recent surveys were meant to identify impacts to resources from certain proposed modifications to Tinian Harbor. Those modifications included replacing and possibly extending the existing breakwater along the current alignment, as well as the construction new breakwater structures in the eastern portion of the harbor limits. The evaluation and reporting was completed by the USFWS, the National Marine Fisheries Service, and the CNMI's Department of Forestry and Wildlife (*Draft Fish and Wildlife Coordination Act Planning Aid Report, Phase 1 Marine Habitat*

*Characterization, Tinian Harbor Modification, January 2017*). A new draft report will be released in the next month. The new proposed modifications received in July 2017 and project footprints for Phases 1a, 1b, and 2, were not assessed at that time, so there is a data gap. However, historical data currently available would be useful to include in any preliminary plans. Additional evaluation of the new project footprints will likely need to occur.

- Given the need for harbor improvement for Tinian, the proposed DoD military training activities on the island, and the proposed harbor modifications by the USACE, the issue of cumulative impacts needs to be carefully considered. More discussion between all stakeholders and agencies should occur so that NEPA requirements can be streamlined and not segmented. A programmatic EIS that covers all of the individual actions within the harbor may be an efficient and environmentally beneficial approach for all the improvement proposals and needs.
- Figure A7 (attached) shows the habitat structures observed during the surveys for USACE Feasibility Study for Tinian Harbor improvements. Surveys did not focus on the finger piers, the vertical quay wall, or the harbor entrance channel, although these were partially surveyed. Figure A-14 (attached) shows a qualitative assessment (presence) of ESA-listed corals (*Acropora globiceps*) within Tinian Harbor on the benthic substrate. While 4 ESA-listed coral species have been documented in the Marianas, only 1 was documented in the areas surveyed in 2016. The vertical components of the harbor were partially surveyed, but the finger pier structures, quay wall, and entrance channel were not evaluated for impacts. Based on the observations reported, there is confirmed presence of *A. globiceps* within these new modification areas, including on the pier sheetpile structures. Figures A12, A18, and A19 (attached) show a qualitative assessment of stony corals, seagrass, and macroalgae abundance within the harbor. The coral abundance was fairly low in most of the federal channel areas that were surveyed, but they were still present. Seagrass, *Halophila* sp., was moderately abundant in some areas and macroalgae within the harbor turning basin occurred in relatively high abundance. The dominant species was *Halimeda* sp., which is a habitat forming species of significance. Surveys between the finger piers and the entrance channel were not the focus of our investigations to this point, so they were only partially surveyed. A quantitative evaluation will be necessary to provide the best discussion of any necessary compensatory mitigation and the cost of a mitigation plan for coral, macroalgae, and seagrass.
- The vertical sheetpile of the finger piers and the quay wall are densely populated by coral colonies of various sizes. Those observations were documented for the previous harbor modification proposal, although they were not directly part of the recently proposed USACE actions and our current habitat maps do not depict them well. Any modification to these structures will require a detailed quantification of these coral communities. This will include data on colony species, sizes, and morphologies. Morphology information is necessary in planning methods for coral transplantation, if possible, and determining ecological functions that would be lost.

- The cover letter references the future use of the harbor by the DoD and that one purpose for the proposed improvements is to accommodate DoD vessels and activities. The DoD has stated in their Commonwealth of the Northern Marianas Islands Joint Military Training (CJMT) draft EIS that the existing condition of the harbor is sufficient to meet their needs and consequently there was no need to include harbor modifications in their NEPA analysis. However, the new proposed modifications involve demolishing and reconstructing finger piers A and B, as well as dredging to a working depth that would accommodate DoD vessels. We understand that the CNMI government is in negotiations with DoD on the use of the harbor facilities for the CJMT proposed actions, but we recommend that if the CNMI has a need to improve these facilities for the explicit purpose of DoD use, that the CNMI government should request the CJMT NEPA process include this proposal within their analysis. This issue was recently highlighted at the Army Corps Coastal Engineering Research Board Meeting in Honolulu in June 2017.
- The demolition of the finger piers, widening of new finger piers, construction of additional sheet pile quay wall, reconstruction of the Connecting Pier, and dredging the harbor bottom would all result in unavoidable loss of coral colonies and other marine trust resources. In the provided Exhibit 15 Dredge Alternative 3 layout, it is not clear if the polygon overlaid on the entrance channel represents the current limits of the Federal channel, or if there is a need to expand the channel to accommodate increased vessel numbers and sizes. We recommend that clarification be given on the adequacy of the existing federal channel and if there is a need to expand the channel boundaries.
- An impact analysis or risk assessment will need to be completed in regard to the possible increased risk of arrival of invasive species through enhanced deliveries of goods, and from an increased number of vessels using the harbor facilities. In addition, bringing in heavy equipment and barges from areas outside of Tinian Island has the potential to import aquatic and terrestrial invasive species as well.

If you have questions regarding this letter, please contact Anthony Montgomery (phone: 808-792-9400; email: [tony\\_montgomery@fws.gov](mailto:tony_montgomery@fws.gov)), Marine Biologist or Jacqueline Flores (phone: 671-989-6744; email: [jacqueline\\_flores@fws.gov](mailto:jacqueline_flores@fws.gov)), Mariana Islands Team Manager.

Sincerely,



Jacqueline Flores  
Mariana Islands Team Manager

Cc: CNMI Commonwealth Ports Authority

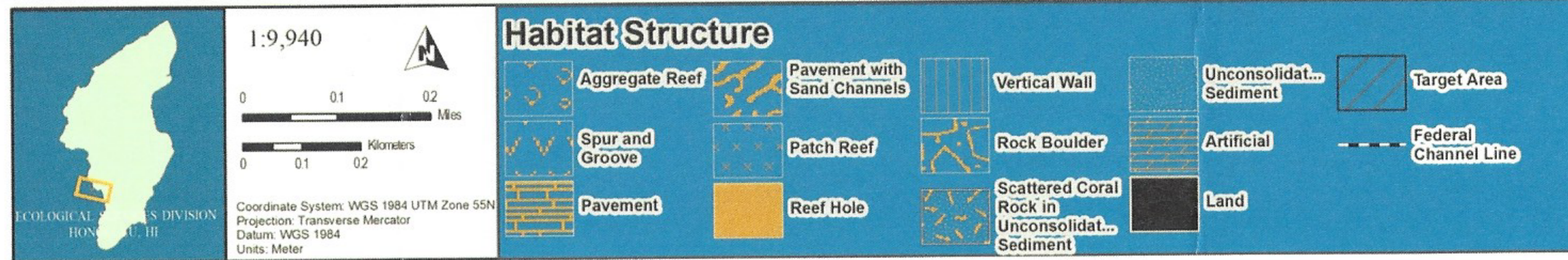
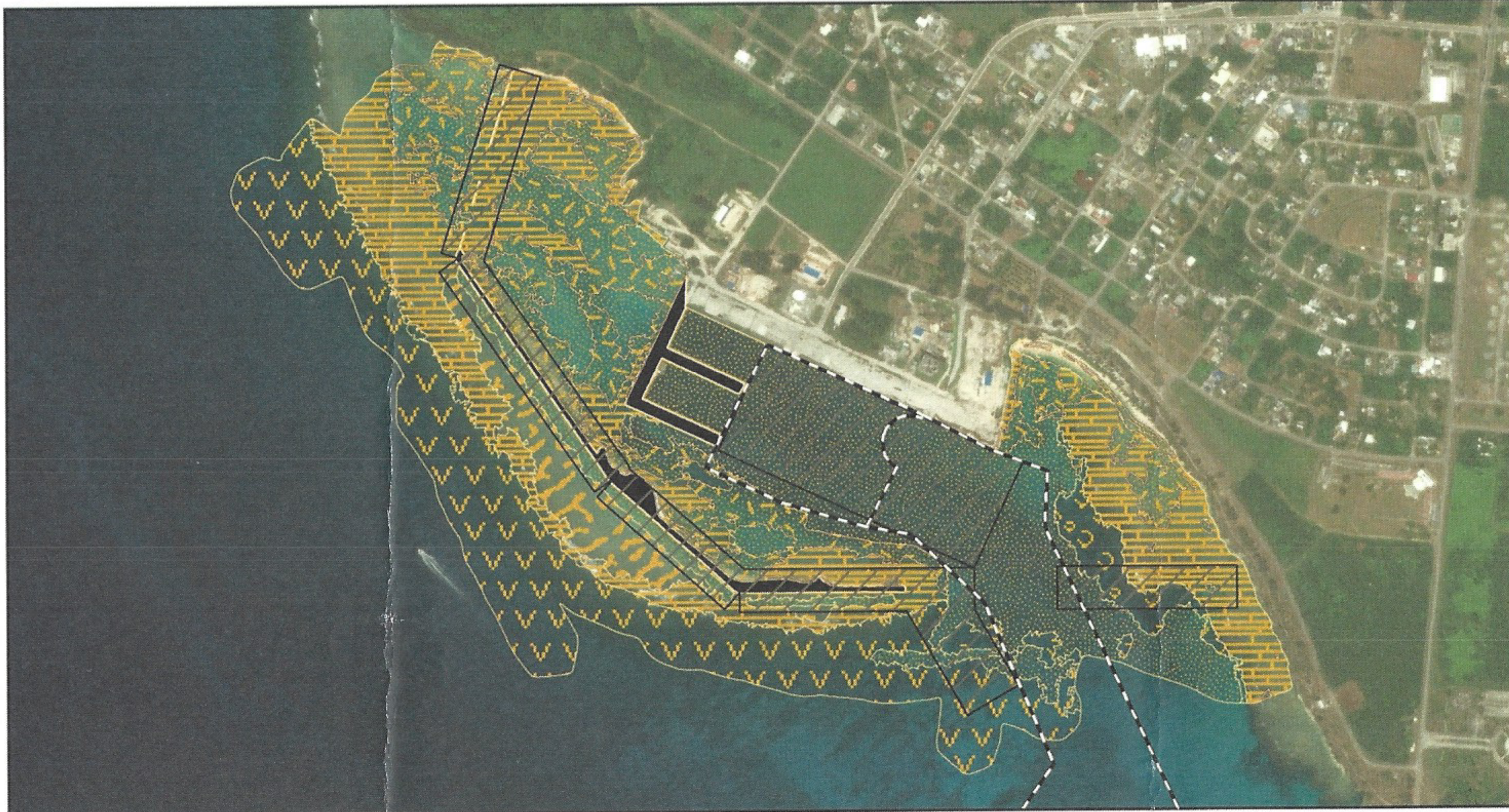


Figure A7: Habitat Structure. Overview of the habitat structures within the project area.



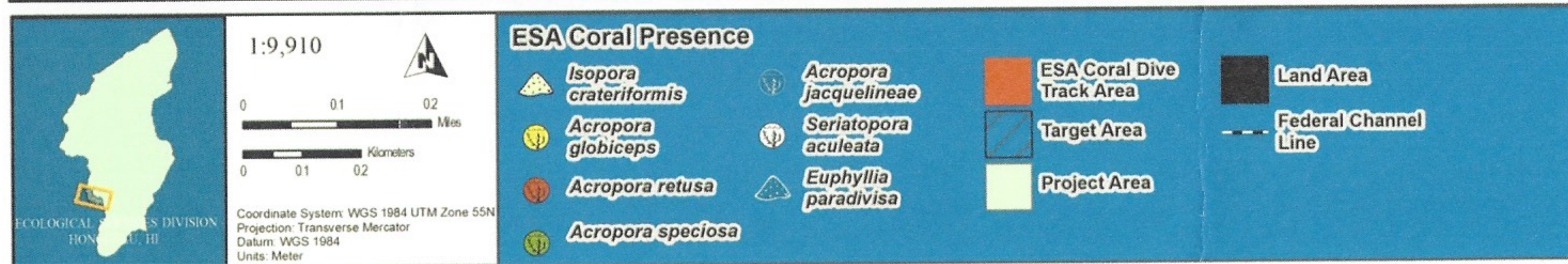


Figure A14: ESA-listed Corals. Overview of the ESA-listed coral species observed within the project area.

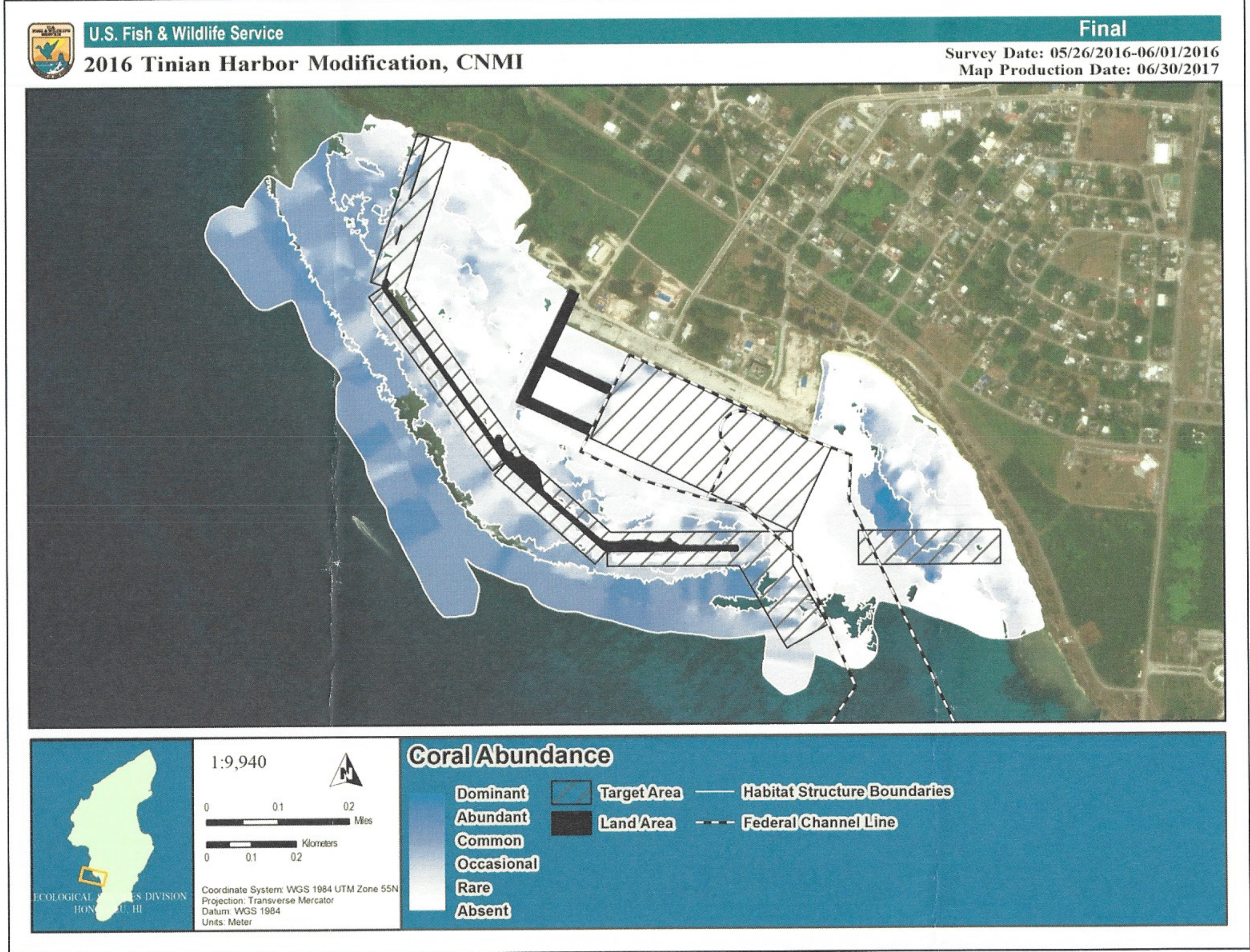


Figure A12: Coral Abundance. Overview of the coral abundance within the project.

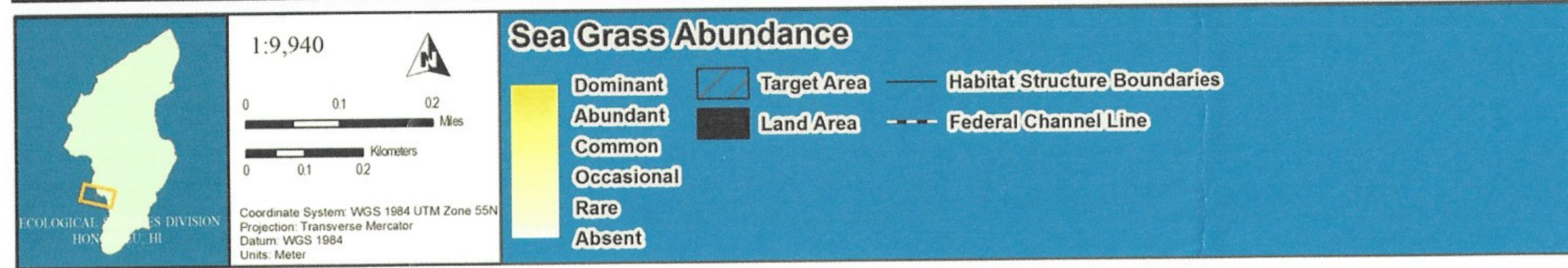
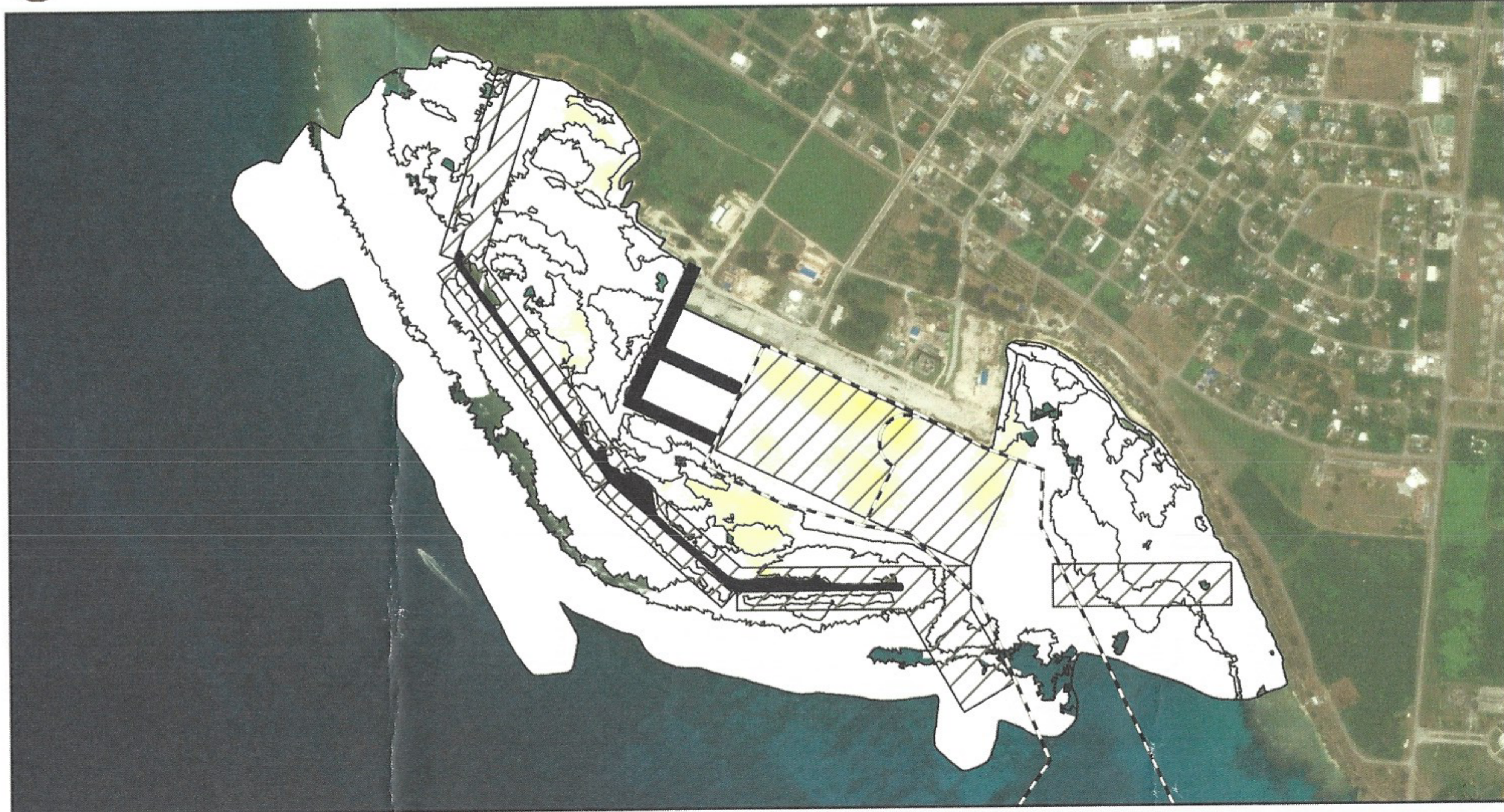


Figure A18: Sea Grass Abundance. Overview of the seagrass abundance within the project area.

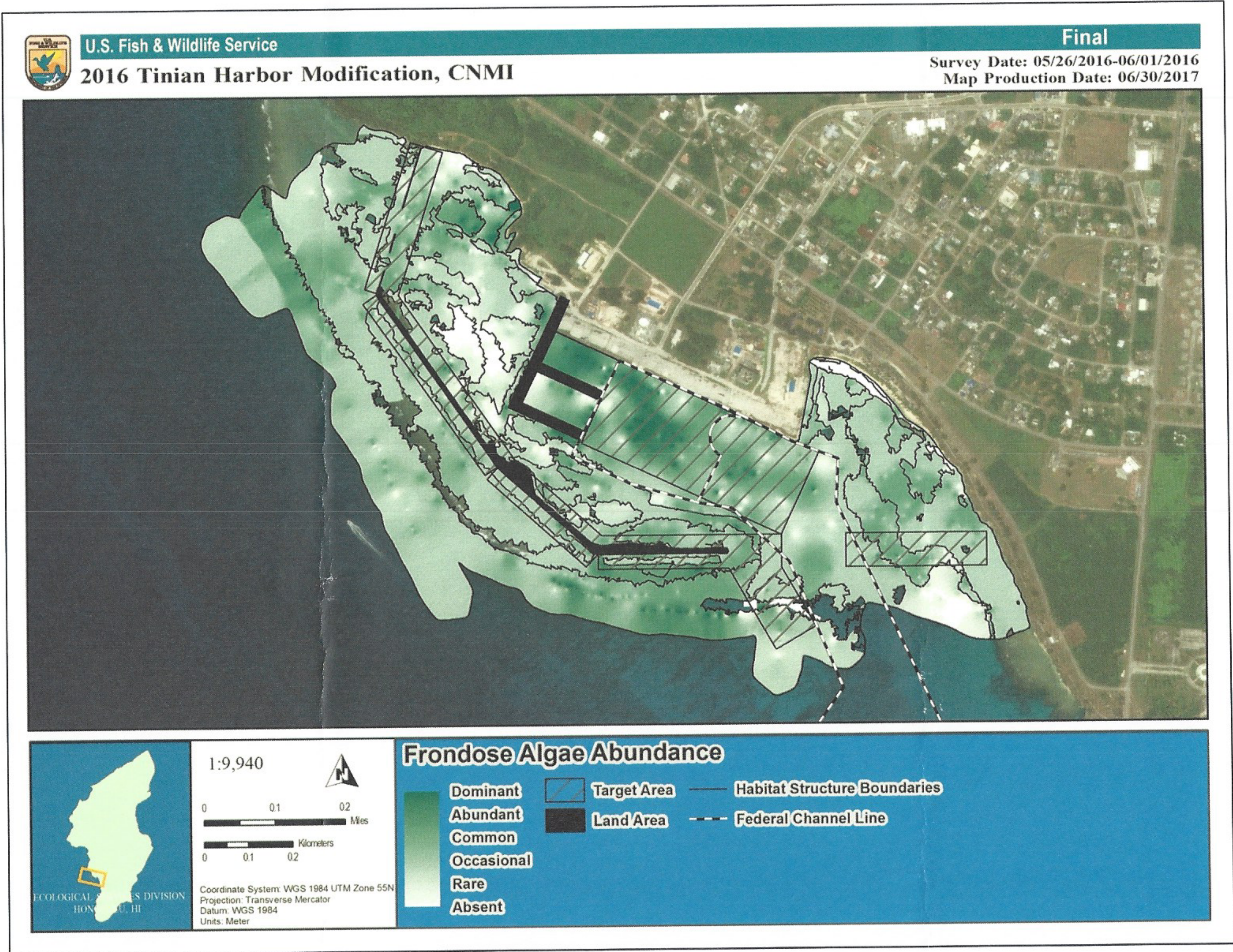


Figure A19: Frondose Algae Abundance. Overview of the frondose algae (macroalgae) abundance observed within the project area.





**U.S. DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL MARINE FISHERIES SERVICE  
Pacific Islands Regional Office  
1845 Wasp Blvd., Bldg 176  
Honolulu, Hawaii 96818  
(808) 725-5000 • Fax: (808) 973-2941

Mr. John E. Gourley  
Micronesia Environmental Services  
John.e.gourley@gmail.com  
PO Box 502802  
Saipan, MP 96950

August 3, 2017

Dear Mr. Gourley,

The National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) received the Micronesia Environmental Services (MES) early coordination request on behalf of the Commonwealth Port Authority (CPA) for the revision of the Tinian Harbor Master Plan. CPA is expected to eventually apply for a Department of the Army permit under Section 10 of the Rivers and Harbors Act and/or Section 404 of the Clean Water Act. The CPA is proposing a two phase plan: phase 1 will be in two sub-parts (a & b) and phase 2 will be a single action. Phase 1 will increase the available berths from one to three, in order to prepare Tinian Harbor for increased use associated with DoD activities, hotel and casino construction, proposed ferry operations, and the needs of local residents. The phase 1a actions are seen as an immediate need and they include development of a second tanker mooring at Berth 3, improvements to Berth 1, and general improvements to wharf safety and night operations. Phase 1b proposed more extensive improvements to Berths 1, 2, and 3; including construction of 1,400 feet (ft) of new sheet pile and the demolition of Finger Pier A to improve harbor maneuvering. Phase 2 is only needed if DoD requires a dedicated wharf and would involve replacing Fingerer Pier B with a 300 ft by 800 ft sheet pile bulkhead structure on all sides.

NMFS PIRO HCD supports the project purpose to adequately meet the need for increased commerce, increased transportation, and to support national security. However, HCD has concerns regarding potential impacts to our trust resources including Essential Fish Habitat (EFH). Planning processes enabled by the National Environmental Policy Act (NEPA) and the Fish and Wildlife Coordination Act (FWCA) would assist the CPA to ensure that the correct information is collected and available to streamline future consultations for EFH under the Magnuson-Stevens Fishery Management and Conservation Act (MSA) and under Section 7 of the Endangered Species Act (ESA). While PIRO HCD will conduct the EFH consultation, PIRO Protected Resources Division will conduct the ESA consultation separately. Both consultations can be initiated through this email address: EFHESAconsult@noaa.gov.



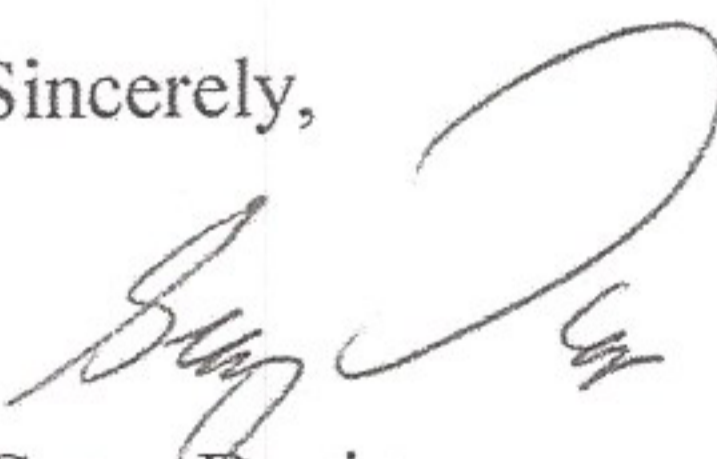
Based on the information provided, general threats include: runoff and stormwater, spills, invasive species, marine debris, sedimentation and turbidity, noise impacts, and the direct loss of habitat associated with the wharf and pier faces consisting predominately of complex multi-specie assemblages of coral growing on existing wharf and pier surfaces. These threats need to be examined both independent to this action and as they relate to the cumulative impacts associated with other proposed activities within the harbor area.

PIRO HCD expects that the CPA will conduct comprehensive environmental planning (e.g., NEPA and FWCA, if applicable) for the Tinian harbor Master Plan revision in order to develop suitable avoidance and minimization measures to abate the aforementioned threats and a proposed compensatory mitigation for any unavoidable losses. The CPA should analyze alternatives for each phase of the plan and coordinate with NMFS throughout the planning process at appropriate milestones, prior to consultations. The planning process should also include the appropriate components that clarify how key threats will be managed: a Stormwater Pollution Prevention Plan, a Biosecurity Plan and a Spill Prevention, Control and Countermeasure Plan should all be developed and reviewed by relevant regulatory authorities. In addition, comprehensive environmental planning will provide early opportunities to discuss unavoidable losses and identify opportunities for suitable offset/mitigation approaches.

Due to the potential for substantial loss of EFH and coral reef resources as a result of implementing phase 1b and phase 2, an expanded EFH consultation is expected, which will need to be supported by quantitative marine resource information. Quantitative marine resource assessments should be performed in the project footprint and throughout areas that may be subject to indirect impacts. The CPA should convene an interagency team, including both local and federal partners, to look at project alternatives and provide guidance to CPA on offset/mitigation approaches, especially with respect to sensitive and hard-to-replace EFH, such as coral reef resources.

In conclusion, PIRO HCD greatly appreciates the CPA and MES efforts to effectively coordinate with us early on the proposed Tinian Harbor Master Plan and we look forward to working together through the project planning and consultation phases. PIRO HCD looks forward to the opportunity to discuss more in depth our concerns regarding the potential impacts to NOAA trust resources resulting from this project. Should you have any questions, comments, or when you require additional technical assistance, please contact Steve McKagan in our CNMI Field Office [steven.mckagan@noaa.gov](mailto:steven.mckagan@noaa.gov) or 670-234-0004.

Sincerely,



Gerry Davis  
Assistant Regional Administrator  
Habitat Conservation Division



DEPARTMENT OF THE ARMY  
HONOLULU DISTRICT, U.S. ARMY CORPS OF ENGINEERS  
FORT SHAFTER, HAWAII 96858-5440

November 2, 2017

SUBJECT: Tinian Harbor Master Plan Proposed Modifications; Department of the Army  
Reference No.: POH-2017-232

Mr. John Gourley  
Micronesia Environmental Services  
P.O. Box 502802  
Saipan, MP 96950

Dear Mr. Gourley:

The Commonwealth Ports Authority is updating the Tinian Harbor Master Plan, Tinian, Commonwealth of the Northern Mariana Islands (CNMI). The U.S. Army Corps of Engineers received your request for regulatory and environmental review information for the revision of the Tinian Harbor Master Plan. We have assigned the proposed action a Department of the Army reference number: POH-2017-232. Please cite the reference number in any correspondence with us concerning this project.

According to your letter dated July 5, 2017, and associated figures, preliminary harbor modifications proposed for Phase 1 include, but are not limited to, the following: new bollards, new fenders, repair of wharf cap and bull rail, construction of 1,400 feet of new sheet-pile quay wall and concrete cap, removal of Finger Pier A sheet pile quay walls, excavation of approximately 10,000 cubic yards of fill between quay walls, dredging approximately 30,000 cubic yards to a depth of -28 MLLW, grading the shoreline, and placement of rock revetment on the shoreline. If the Department of Defense determines a material handling wharf is required for operations on Tinian, then Phase 2 will involve the replacement of Finger Pier B with a 300-foot by 800-foot wharf. Phase 2 also includes sheet pile bulkheads, retaining walls, and in-water fill.

Based on an initial review of the site plans and aerial photos, many of the proposed actions will require a Department of the Army (DA) permit from the U.S. Army Corps of Engineers (Corps).

Under Section 10 of the Rivers and Harbors Act of 1899, a Section 10 DA permit is normally required for work or structures in or affecting navigable waters of the U.S. This includes work that is in, over, or under navigable waters (e.g., piers, utility lines, subsurface pipes). Under Section 10, our line of jurisdiction is the mean high water mark. Under Section 404 of the Clean Water Act, a DA permit is normally required for the discharge of dredged or fill material (e.g., fill, excavation, or mechanized land clearing) into waters of the U.S., including marine waters, streams, drainages, and



wetlands. Under Section 404, our line of jurisdiction is the high tide line in marine waters and the ordinary high water mark in fresh waters. Please read the enclosure entitled *Clean Water Act and Rivers and Harbors Act Extracts and Definitions* (Enclosure 1) which further describes the laws that may apply to the proposed work.

Most of the proposed activities would require a standard individual permit. In order to use a Nationwide Permit (NWP), we must have a NWP that covers the proposed activity, the activity must have independent utility, and we must determine both individual and cumulative adverse effects of the activity are no more than minimal. Some of the work may qualify for a Nationwide Permit or Letter of Permission; please coordinate with the Corps prior to submitting an application. For all work in marine waters, the high tide line and the mean high water line must be demarcated on project drawings. Since the proposed work includes either dredging or in-water disposal of dredged material, the Environmental Protection Agency should be contacted for sediment testing and/or disposal requirements.

#### Clean Water Act Section 404(b)(1) Guidelines

If the proposed actions are processed as a Standard Individual Permit, the project proponent will need to comply with the Clean Water Act Section 404(b)(1) Guidelines by conducting an alternatives analysis for the project. Under the Guidelines, the discharge of dredged or fill material into waters of the United States is prohibited unless the proposed discharge is the least environmentally damaging practicable alternative capable of achieving the proposal's purpose. For non-water dependent activities associated with discharges in special aquatic sites (i.e., wetlands, coral reefs), practicable alternatives that do not involve discharges in these sites are presumed to be available, unless clearly demonstrated otherwise. For water dependent or non-water dependent activities associated with discharges in special aquatic sites, an additional presumption is that all practicable alternatives that do not require discharges in these sites are presumed to have less adverse impact on the aquatic ecosystem, unless clearly demonstrated otherwise. The permit applicant has the opportunity to rebut these presumptions for a proposed project.

Enclosed for your information is an *Alternatives Analysis Framework*, a summary of the Section 404(b)(1) process and requirements, which should be carefully read to help you understand this process (Enclosure 2). Although the permit applicant must prepare alternatives information, the Corps reviews and determines all aspects of the alternatives analysis (e.g., project purpose, project criteria, geographic area, etc.). The preparation of an alternatives analysis requires considerable coordination between the permit applicant and the Corps. We ask that the permit applicant coordinate with us to complete our evaluation of potential on-site and off-site alternatives in order to avoid and minimize impacts to waters of the U.S. We recommend an alternatives analysis not be prepared prior to coordinating with the Corps.

### Mitigation

All permit applicants are required to avoid and minimize impacts to waters of the U.S. "Mitigation" consists of actions to avoid, minimize, and compensate for impacts from the project. A compensatory mitigation plan is used to compensate for the unavoidable loss of waters of the U.S. and to ensure that those losses minimize adverse effects to the aquatic environment. For permittee responsible compensatory mitigation, mitigation plans should be prepared in accordance with the Federal Compensatory Mitigation for Losses of Aquatic Resources Final Rule (33 CFR Parts 325 and 332, April 10, 2008) which became effective June 9, 2008.

### Section 7 of the Endangered Species Act

In the project vicinity, a number of fish and wildlife species have been listed as threatened or endangered under the Endangered Species Act (ESA). Under the Corps' Federal permit program, proposed projects are reviewed for potential effects to threatened and endangered species pursuant to the ESA. The ESA requires that Federal agencies such as the Corps take action as necessary to ensure that we do not authorize, fund, or carry out actions that are likely to jeopardize the continued existence of endangered or threatened species or that would result in the destruction or adverse modification of designated critical habitat. To fulfill our obligations required under the ESA, the Corps, through consultation with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS), must evaluate the potential impact of the proposed work on listed species.

Before we can move forward with the required consultations, the project proponent must contact the NMFS and the USFWS to determine what listed or proposed species are present in the action area. The project proponent must then submit a Biological Assessment (BA) to the Corps that addresses impacts to all listed or proposed species present. A qualified biologist, with experience and/or strong understanding of the species of concern and their habitat as it relates to the project, should prepare the BA. Please be advised that during the course of the ESA Section 7 consultation, the project proponent may receive and need to comply with periodic requests from the Corps for additional information or changes in the BA until there is sufficient information in it to be ruled on by the NMFS and the USFWS.

### Magnuson-Stevens Fishery Conservation and Management Act, Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) established procedures designed to identify, conserve, and enhance Essential Fish Habitat (EFH) for those species regulated under a Federal fisheries management plan. The MSA requires Federal agencies to consult with NMFS on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH. The project area includes EFH for multiple Management Unit Species. The project proponents should prepare and submit an assessment of the potential impacts of the proposed work on EFH. The Corps must consult with the NMFS pursuant to the

requirements of the MSA for adverse effects to EFH. We recommend early coordination with NMFS so the project can be designed to incorporate measures that will avoid or minimize impacts to EFH.

#### Section 106 of the National Historic Preservation Act

In accordance with Section 106 of the National Historic Preservation Act, Federal agencies, such as the Corps, are required to take into account the effects of any permitted action to historic properties, which includes both archaeological resources on the surface or below ground, as well as historic buildings and structures that are listed in, or eligible for listing in the National Register of Historic Places (NRHP). Based on available information, the proposed work likely has the potential to cause effects to historic properties. If the Corps determines there could be an effect to archaeological resources or historic properties, the project proponent will be asked to conduct a cultural resource assessment for the project site. The assessment must be completed by a qualified archaeologist, architectural historian, or an appropriate historic preservation specialist.

Our regulations at 33 CFR Part 325, Appendix C, list the criteria for the areas that must be included in an assessment. The cultural resources assessment and report must be designed to provide enough information for the Corps to determine the NRHP eligibility of historic properties and to assess the potential effects of the proposed project to those properties. Depending upon the results of this assessment, it is possible that some additional work or evaluative testing may be required. If we determine the proposed project has the potential to adversely affect historic properties, additional consultation will be required to avoid, minimize, or mitigate the adverse effects.

We will consult with the CNMI State Historic Preservation Office at the Department of Community and Cultural Affairs in the Division of Historic Preservation to ensure any direct, indirect, or adverse impacts on a site that is eligible for inclusion in the National Register of Historic Places are addressed through the Section 106 review process.

#### Section 307 of the Coastal Zone Management Act

Under the Coastal Zone Management Act, all Federal agencies are required to conduct planning, management, development, and regulatory activities in a manner consistent with federally-approved state/territorial coastal zone management programs. Before the Corps can issue a permit, the proposed project must be consistent with the enforceable policies of CNMI's Coastal Management Program. In CNMI, the Bureau of Environmental and Coastal Quality, Division of Coastal Resources Management (BECQ-DCRM) is responsible for administering the program. Please coordinate with BECQ-DCRM to ensure proposed actions are consistent with CNMI's Coastal Management Program.

Section 401 of the Clean Water Act

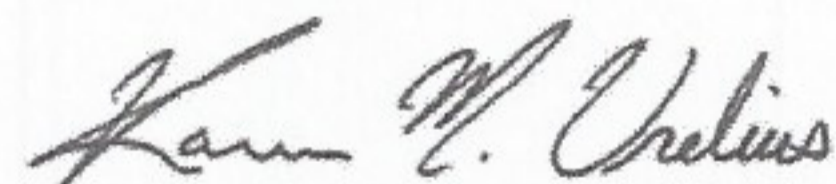
When you apply for a Section 404 permit from the Corps, you are required to obtain Section 401 water quality certification from CNMI's Bureau of Environmental and Coastal Quality, Division of Environmental Quality (BECQ-DEQ). Section 401 of the CWA specifically addresses the discharge of pollutants by ensuring compliance with effluent limitation, new source performance standards, toxic pollutant limitations and other appropriate requirements of law or regulation. This authority is delegated directly from the U.S. Congress to the states/territories, and allows each to establish policies to ensure that approved activities will meet applicable water quality standards. Please coordinate with the BECQ-DEQ regarding Section 401 requirements.

Pre-Application Meeting

Well in advance of submitting a permit, I recommend requesting a pre-application meeting with the project proponent, the consultants/agents, and all of the resource agencies responsible for administering Federal and local laws. This will help ensure expectations during the permitting process are clear and the project proponent is aware of relevant laws, regulations, policies, processes, mitigation requirements, timeframes, and agency concerns. Please let me know if I could be of assistance in helping coordinate a pre-application meeting.

If you have any specific questions about the Corps' regulatory program, including jurisdictional limits, whether a permit is required for proposed activities, or what kind of permit may authorize a proposed activity, please contact me at (671) 339-2108 or [karen.m.urelius@usace.army.mil](mailto:karen.m.urelius@usace.army.mil). For additional information about our regulatory authorities and permit process, you may also access the Honolulu District's Regulatory website at: <http://www.poh.usace.army.mil/Missions/Regulatory/> or our national website at: <http://www.usace.army.mil/Missions/Regulatory/>.

Sincerely,



Karen M. Urelius  
Project Manager

Enclosures



Commonwealth of the Northern Mariana Islands  
OFFICE OF THE GOVERNOR  
Bureau of Environmental and Coastal Quality  
Division of Coastal Resources Management  
P.O. Box 10007, Saipan, MP 96950  
Tel: (670) 664-8300; Fax: (670) 664-8315  
[www.crm.gov.mp](http://www.crm.gov.mp)



Frank M. Rabauliman  
Administrator

Janice E. Castro  
Acting Director, DCRM

August 3, 2017

Mr. John Gourley  
Micronesian Environmental Services  
P.O. Box 502802  
Saipan, MP 96950

RE: Revision of the Tinian Harbor Master Plan  
Request for Regulatory and Environmental Review

Dear Mr. Gourley,

Thank you for requesting comments and permitting guidance from Division of Coastal Resources Management (DCRM) regarding the Tinian Harbor Master Plan update. We understand that possible actions include dry-land improvements to the existing berths, in-water work on the existing piers and walls, dredging, construction of a new 300'x800' pier, re-design of the small boats harbor, and land-use planning for the upland port area to Suzuran Street.

Please be advised that the geographic area addressed by this plan falls within the Port and Industrial, Coastal Hazards, and Lagoon and Reef Areas of Particular Concern (APCs). Implementation of these proposals will at the very least require a Water Quality Certification and compliance with relevant management standards and use priorities of APCs as well as a Major Siting Permit from DCRM (see NMIAC §15-10-020(jj)(1), defining major sitings as including "harbor structures") in addition to any other federal and CNMI permits identified.

While DCRM will be better able to anticipate impacts to terrestrial and marine resources when a more detailed design and construction methodology is developed, from this conceptual phase it would appear that the extension of a cargo/tanker house under Phase 1a may increase the risk of spills and that Phases 1b and 2 would have significant direct and possibly cumulative impacts on water quality, marine species and habitat, and public access, particularly during dredging operations. We would anticipate these impacts to be detailed in an environmental impact assessment and avoided, minimized, or mitigated to the greatest extent practicable during the project planning process.

While DCRM does defer to the Commonwealth Ports Authority to approve port-related uses, with respect to upland development, DCRM maintains that activities which would have a significant adverse impact on historic properties, such as House of Taga, are unacceptable uses (§15-10-340). Therefore, DCRM encourages the preservation of the aesthetics surrounding House of Taga, including green space and consideration of noise limits beyond its parcel. Industrial manufacturing may prove appropriate within the APC; however, the range of effects


on coastal resources would depend on the nature of the operation. Compatibility of proposed uses would ultimately be reviewed by the CRM Agency Board for consistency with general criteria for CRM permits (NMIAC §15-10-305) and specific criteria for major sitings (NMIAC §15-10-505). We would encourage project proponents to meet with our office and technical staff from the Agency Board early in the planning process to ensure early issue identification and avoidance to support a streamlined permit application process. To support this shared objective, the DCRM Permitting Section would be happy to arrange an interagency pre-application meeting as this planning process moves forward.

Additionally, DCRM recommends that the Commonwealth Port Authority take into account all other projects that have already been proposed for in this area as well as pending harbor improvements studied by the US Army Corps of Engineers.

Thank you for the opportunity to provide early feedback on the revision of the Tinian Master Plan and potential permitting requirements that should be considered in the planning and implementation phases of this project.

Please contact me at [janicecastro@becq.gov.mp](mailto:janicecastro@becq.gov.mp) should you have any additional questions.

Sincerely,

  
JANICE E. CASTRO  
Acting Director  
Division of Coastal Resources Management



John Gourley &lt;john.e.gourley@gmail.com&gt;

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**BECQ Comments - Tinian Harbor Master Plan**

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Ray Masga &lt;RayMasga@becq.gov.mp&gt;

Wed, Aug 2, 2017 at 6:01 PM

To: John Gourley &lt;john.e.gourley@gmail.com&gt;

Cc: Leilani DLG &lt;Leilanisdg@becq.gov.mp&gt;, Rodney Camacho &lt;RodneyCamacho@becq.gov.mp&gt;, Jonathan Arriola &lt;jonathanarriola@becq.gov.mp&gt;

Hi John,

Please find below BECQ's comments to the subject matter above. Please let us know if you have any questions or concerns about our comments and so we can address them accordingly.

Regards,

Ray

---

**BECQ Comments to Tinian Harbor Master Plan****Waste Water; Earthmoving and Erosion Control Program:**

I would recommend CPA or SSFM apply for One Start Earthmoving Permit. The master plan calls for reconstruction of Berth 1-3 Quay Wall, demolition and dredge of Finger Pier A, and it talks about other expansion throughout the harbor. I would be interested to see the Erosion Control plans both on the Port and in the water.

**Toxic Waste Management Program:**Phase 1a:

- Of the demolition debris from the old fencing, ferry terminal and other unnecessary structures adjacent to Berth 1, what will be reused, what will be disposed of, and where will it be disposed of?

Phase 1b:

- The existing foam-filled fenders which will be replaced, will this be disposed of, if so, where?

**Appendix C Commonwealth of the Northern Mariana – Capital Improvement Program, Tinian Harbor Terminal Master Plan, Opinion of Probable Construction Cost – Conceptual Design Level**



Appendix C

**Comonwealth of the Northern Mariana - Capital Improvement Program**  
**Tinian Harbor Terminal Master Plan**  
*Opinion of Probable Construction Cost - Conceptual Design Level*

PHASE 1 ITEM DESCRIPTION	TOTAL
North Quay Improvements	\$2,159,000
Berth 1 Bulkhead Replacement	\$7,583,000
Berth 1 Ro-Ro Ramp	\$1,711,000
Upland Renovation	\$808,000
<b>TOTAL</b>	<b>\$12,261,000</b>

PHASE 2 ITEM DESCRIPTION	TOTAL
North Quay Bulkhead Repair	\$27,879,000
Berth 3 Tanker Manifold	\$236,000
Conneciting Pier Repairs	\$392,000
Finger Pier A Demolition	\$9,740,000
<b>TOTAL</b>	<b>\$38,247,000</b>

PHASE 3 ITEM DESCRIPTION	TOTAL
South Quay Construction and Fill	\$38,465,000
Berth 5 Pile-Supported Platform	\$14,915,000
Berth 5 Ro-Ro Ramp	\$1,701,000
Berth 6 Quay Wall	\$4,690,000
South Quay Utilities	\$850,000
<b>TOTAL</b>	<b>\$60,621,000</b>

**INCLUDES:**

- Prime Contractor Home Office Overhead and Profit (15%)
- Mobilization/Demob/Field OH (20%)
- Contingency (20%)
- Environmental Mitigation (5%)
- Permitting, EA/EIS/NEPA, Design, Construction Management, Owner Costs (25%)

**Appendix D**    ***“Notes of Meeting”*** for Tinian Harbor Master Planning Services  
(Project No. CPA-TS-001-15)

**DATE OF MEETING:** Wednesday, 07 September 2016

**TIME:** 9:00 a.m. CHST

**LOCATION:** via Teleconference

**WRITTEN BY:** Moffatt & Nichol  
(D. Kokubun, C. Matson, D. Cronin)

**PROJECT TITLE:** Tinian Harbor Master Planning Services (Project No. CPA-TS-001-15) and Rota West Harbor Master Planning Services (Project No. CPA-RS-001-15)

**MN PROJECT:** 9538/9539

**SUBJECT:** Kick-Off Meeting / Teleconference

**PARTICIPANTS:** See attached *List of Participants*

**DISTRIBUTION:** Attendees, Maryann Lizama, Christopher Tenorio, Wendi Prater

**REFERENCE DOCUMENTS:** Agenda, Project Schedule (dated 30 August 2016)

#	ITEM	ACTION	DUE DATE		
	<b>Communication</b>				
	Designated points of contact for each harbor for the Master Plan projects:				
1	A. Tinian Harbor – Gerry Crisostomo: (670) 433-9294 B. Rota Harbor – Rodney Taisacan: (670) 532-9489 or 9497				
	<b>Vision for Master Plans</b>				
	C. Tinian Harbor				
	<ol style="list-style-type: none"> <li>1. Larger berths to accommodate cruise ships and ferries.</li> <li>2. Breakwater repair / replacement / modification needed <ul style="list-style-type: none"> <li>• There is Feasibility Study being prepared by the U.S. Army Corps of Engineers (USACE), Honolulu District, for navigation improvements for both Tinian Harbor and Rota West Harbor. The Feasibility Study for Tinian Harbor is looking into repairs / replacement / modification of the breakwater. The CNMI Lt. Governor’s Office is the local sponsor for the Feasibility Studies. Moffatt &amp; Nichol (MN) has scheduled to teleconference with Milton Yoshimoto and Jessica Podoski at the USACE Honolulu District later this week to discuss their project.</li> </ul> </li> </ol>				
2	<ol style="list-style-type: none"> <li>3. Master Plan should consider how the existing fingers piers are configured in the future – i.e., maintain similar pier configuration, fill-in space between fingers, other?</li> <li>4. Maximize usage of seaport and vacant land <ol style="list-style-type: none"> <li>a. Two new warehouses and a new operations building will be constructed soon.</li> <li>b. Consider casino on adjacent property.</li> </ol> </li> <li>5. Current depth of harbor and channel is a concern <ol style="list-style-type: none"> <li>a. It would be ideal if harbor could accommodate ships that draft 40 feet (Note: Saipan Harbor dredge depth is -40 feet).</li> <li>b. Tinian Harbor dredge depth is currently -28 feet and channel dredge depth is -35 feet.</li> </ol> </li> </ol>				

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- c. USACE is currently looking into a maintenance dredging project for the harbor but the project will only restore the harbor to a dredge depth of -28 feet. This depth should accommodate the military (U.S. Marines).
  - d. Tinian Harbor was last dredged in 1943 during construction for the war effort.
  - e. A list of cruise ship companies that have previously contacted the Port of Tinian to inquire about harbor depths and access will be sent to MN to research vessels' draft and assess appropriate future harbor and channel depths. CPA (Crisostomo)
- A. Rota West Harbor
- 1. Construction of a new breakwater to the North is a priority
    - a. Safety concerns exist during typical wind and wave conditions. Just two months ago, a person was thrown overboard during cargo offloading operation due to the wind and wave conditions.
    - b. The port regularly experiences difficulties with cargo offloading during typical wind and wave conditions.
    - c. Cargo barges are often forced to bypass the port due to sea conditions that prevent vessels from entering the harbor.
    - d. The Feasibility Study being prepared by the USACE, Honolulu District, for navigation improvements for Rota Harbor will also address the need for a new breakwater.
  - 2. Dredging
    - a. Current allowable draft in the harbor is 14 feet. This is adequate for current barges that call at the port under calm conditions but swells that enter the harbor during cargo off-loading operations often create safety issues.
    - b. Discussions with USACE have not progressed since their visit in June 2016. It was suggested that the USACE should be included on future calls to discuss the Master Plan and be invited to the October Public and Stakeholder Meetings. MN (Kokubun)
  - 3. Structural repairs of the existing bollards, fenders and armor stones are already planned.
  - 4. Since Rota Harbor is the only port for the island, it is essential to be able to offload cargo, including building materials, on a regular and reliable basis to support the building industry and help stimulate the economy.
  - 5. Master Plan should consider opportunities for future port development and expansion, economic development, and tourism.
  - 6. Master Plan should consider if / how the harbor could accommodate future ferry and cruise ship visits.
  - 7. MN would like to meet with the vessel and terminal operators during the upcoming visit in October to gain additional insight into navigation issues and input into possible improvements to the harbor and breakwater. The Port can help coordinate this meeting. CPA (Prater)

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**Public and Stakeholder Meetings**

- 3 A. CPA recommends having the meetings and opening it up to the public and stakeholders to receive feedback from a broad range of interests.
  - B. Tentative schedule for the Public and Stakeholder Meetings is the week of 10 October 2016 (Note: Monday is Discover's Day Holiday); dates need to be confirmed with CPA (Wendi Prater). MN (Kokubun / CPA (Prater))
- 



- C. MN will coordinate invitee list with Wendi Prater. The Lt. Governor’s Office shall be included on the invitee list. MN (Kokubun) / CPA (Prater)
- D. CPA recommended scheduling the Public and Stakeholder Meeting for after work hours (say, 6:00 p.m.) to facilitate maximum participation by the public and stakeholders.
- E. Rota meeting likely 50+ attendees, Tinian meeting less than 50 attendees.

***Rota Harbor Field Work – Metocean Instrumentation, Dive Investigation, Hydrographic Survey***

- A. Metocean instrumentation will be installed near the channel entrance (but outside areas of navigation) to gather information on the wave and current conditions. The instrumentation will be installed in October 2016 and will remain in place to record data for about 3 months. MN Team will check with the CNMI Bureau of Environmental and Coastal Quality (BECQ) if permits are required for the instrumentation activity. RFP (Puckette)
- B. Port of Rota’s on-site crane may be used to lower the metocean equipment into the water. Coordinate with Rodney Taisacan. RPS (Puckette)
- C. Receiving and on-site storage of the metocean equipment may be coordinated with R. Taisacan. RPS (Puckette)
- 4 D. The wind gauge (anemometer) may be installed on the roof of the Seaport Building. Coordinate with R. Taisacan. RPS (Puckette)
- E. MN will be conducting a dive inspection of the harbor in October 2016. The Port would like the Berth 1 and 2 structures to be inspected. A future call with Port of Rota will be scheduled to determine what other structures the Port would like inspected during MN’s dive inspection. MN (Kokubun, Pope)
- F. A dive permit is required for the dive inspection. MN to coordinate with R. Taisacan. MN (Pope)
- G. R. Taisacan offered to send to the MN Team the names of companies through which a boat and SCUBA tanks may be rented. CPA (Taisacan)
- H. A hydrographic survey is planned for the harbor in late October / early November 2016.
- I. Metocean instrumentation, dive inspection and hydrographic survey should be coordinated with the local Coast Guard. W. Prater can provide the Coast Guard contact information.

***Tinian Harbor Field Work – Hydrographic Survey***

- 5 A. Existing metocean data and an inspection report from a prior underwater structural investigation conducted by MN for the CNMI Capital Improvement Program Office will be used for the Tinian Harbor Master Plan.
- B. A hydrographic survey is planned for the harbor in late October / early November 2016.
- C. Hydrographic survey should be coordinated with the local Coast Guard.

***Request for Existing Data from CPA***

- 6 A. Please provide data listed in Agenda Item 7 as soon as possible so the MN Team may begin reviewing the data. Ideally, MN would like to receive the information well before the upcoming October 2016 Public and Stakeholder Meetings so the information may be used to prepare for the meetings. MN will reach back to CPA (W. Prater) to coordinate the data request. MN (Kokubun) / CPA (Prater)
- B. The more information that can be provided to the MN Team, the more complete and comprehensive the Master Plans for both harbors can be.



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**Project Schedule**

- 7
- CPA had no comments or requested changes to the attached project schedule at this time.

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**Other**

- 8
- A. CPA has already been coordinating with the Department of Homeland Security (DHS) and Federal Emergency Management Agency (FEMA) on typhoon and emergency response issues. The master planning process should include coordination with those federal agencies. CPA will send contact information for both federal agencies to the MN Team. CPA (Fermin)
- B. Port of Rota requested a copy of the Rota East Harbor Master Plan. MN (Matson)

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~ End Notes of Meeting ~





# AGENDA

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**Subject: Tinian Harbor Master Plan, Project No. CPA-TS-001-15  
Rota West Harbor Master Plan, Project No. CPA-RS-001-15  
Post-Award Kickoff (PAK) Meeting  
Wednesday, 07 September 2016, 9:00 a.m. ChST**

**M&N Job No.: 9538, 9539**

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1. Personnel introductions and discussion of roles / responsibilities (ALL)
  - A. Communications lines
  - B. Contact information
2. Discussion of vision for master plans for Tinian and Rota West Harbor (led by Commonwealth Ports Authority [CPA]), including:
  - A. CPA's expectations for the master plans
  - B. Critical issues and priorities for both harbors
  - C. New opportunities for both harbors
  - D. Time horizon for each master plan
  - E. Funding considerations (e.g., sources, limitations, opportunities, etc.) and construction (work-to) budgets for full build out of master plans (if known)
  - F. Phasing considerations / key milestones (if any)
3. Saipan / Tinian / Rota West visit pre-planning (led by Moffatt & Nichol [MN])
  - A. Kick-Off Meetings with CPA, first Public & Stakeholder Meetings, and field visits tentatively proposed for week of 10 October 2016
  - B. Approach to, and schedule for, public and stakeholder meetings
    - 1) CPA preferred approach to meetings
    - 2) Preferred meeting time (a.m. / p.m.(?))
    - 3) CPA to provide venue, public address (PA) system, video projector and screen
  - C. Prepare list of invitees to each public and stakeholder meeting with input from CPA
  - D. Other administrative considerations
4. Metocean field work for Rota West Harbor (MN)
  - A. Points of contact to begin coordination
    - 1) At a minimum, MN needs to meet with tug captain and other harbor users during first visit
  - B. Required permits / permissions for field work(?)
  - C. Shipping and storage of two boxes of metocean monitoring equipment
  - D. Crane available on site (for lowering metocean equipment into water)?
  - E. Identify location for wind instrumentation (anemometer) to be installed
  - F. Local boat rental



5. Dive inspection of Rota West Harbor (MN)
  - A. Define limits of inspection
  - B. Required permits / permissions for inspection(?)
  - C. Local dive shops (for filing SCUBA tanks)
  
6. Hydrographic surveys of Tinian Harbor and Rota West Harbor (MN)
  - A. Points of contact to begin coordination
  - B. Required permits / permissions for surveys(?)
  - C. Local boat rental
  
7. Request for existing data from CPA (MN)
  - A. CPA administrative rules, harbor and land use policies, wharfage and tariff policy, and other policies that govern CPA's use and management of the harbors
  - B. Recent and other pertinent documents related to harbor policies, budgets, debt and future spending
  - C. Summary of MN data on-hand:
    - 1) Rota Harbor Master Plan (Sea Engineering, Inc. 1997)
    - 2) Rota East Harbor Feasibility Study (MN 2013)
    - 3) Tinian LIDAR bathymetry (2014)
    - 4) Assessment of the Tinian Harbor (MN 2015)
    - 5) Rota East Harbor Record Drawings (WK 2004)
  - D. Existing CPA / CNMI reports, studies, and record documents, including:
    - 1) Prior harbor master plans and master plan documents
    - 2) Existing bathymetric, topographic surveys
    - 3) Geotechnical borings, reports
    - 4) Structural condition surveys
    - 5) Wind / wave / current studies
    - 6) Mooring and berthing studies
    - 7) Environmental / hazardous materials / archaeological and historic studies
    - 8) Record ("as-built") drawings
    - 9) Electronic CAD files of harbor and harbor properties
    - 10) Seabridge call records for Rota West Harbor
    - 11) CPA / Tinian Harbor / Rota West Harbor financial statements, independent auditor's report, and existing long-range financial plans
  
8. Proposed project schedule (attached) – key dates (subject to change) (MN):
  - A. Notice to Proceed: 15 August 2016
  - B. Rota West Harbor metocean instrumentation and monitoring: August 2016 – February 2017 (inc. planning, mobilization/demobilization)
  - C. Kick-Off Meetings with CPA and first Public & Stakeholder Meetings: week of 10 October 2016
  - D. Rota West Harbor condition assessment (dive inspection): 10 October – 31 October 2016 (inc. planning, mob/demob)
  - E. Rota West Harbor bathymetric survey: 21 October – 18 November 2016 (inc. planning, mob/demob)
  - F. Tinian Harbor bathymetric survey: 28 October – 21 November 2016 (inc. planning, mob/demob)
  - G. Draft Tinian Harbor Master Plan submittal: 20 February 2017



- H. Draft Rota West Harbor Master Plan submittal: 01 May 2017
  - I. Second Public & Stakeholder Meetings: week of 15 May 2017
  - J. Final Tinian Harbor Master Plan and Rota West Harbor Master Plan submittal: 05 June 2017
9. Miscellaneous (ALL)
- A. Business Gross Revenue Tax (BGRT) – paid to consultant or withheld and paid by CPA directly?

\* Dates cited above are for Saipan, CNMI





**DATE OF MEETING:** Thursday, 08 September 2016 **TIME:** 8:00 a.m. HST

**LOCATION:** via Teleconference **WRITTEN BY:** Moffatt & Nichol  
(D. Kokubun) (rev2)

**PROJECT TITLE:** Tinian Harbor Master Planning Services (Project No. CPA-TS-001-15) and Rota West Harbor Master Planning Services (Project No. CPA-RS-001-15) **MN PROJECT:** 9538/9539

**SUBJECT:** USACE Rota Harbor and Tinian Harbor Integrated Feasibility Study and Environmental Impact Statement (EIS)

**PARTICIPANTS:** U.S. Army Corps of Engineers (USACE): Milton Yoshimoto, Jessica Podoski, Sherida Bonton  
Moffatt & Nichol (MN): Dean Kokubun, Christopher Matson

**DISTRIBUTION:** Attendees

**REFERENCE DOCUMENTS:**

#	ITEM	ACTION	DUE DATE
	MN has been hired by the Commonwealth Ports Authority (CPA) to prepare a Master Plan for Tinian Harbor and a Master Plan for Rota West Harbor.		
	As part of the Rota West Harbor master plan project, the MN Team will be deploying metocean instrumentation to gather wind, wave and current data at Rota West Harbor over a three-month period beginning in mid-October 2016, performing an underwater structural inspection in October 2016, and performing a hydrographic survey (by Sea Engineering, Inc.) in late October / early November 2016.		
1	As part of the Tinian Harbor master plan project, the MN Team will be performing a hydrographic survey (by Sea Engineering, Inc.) in late October / early November 2016.		
	MN's two master plan projects have just begun. The kick-off teleconference for the two projects was just conducted on Tuesday, 06 September (HST). The project scope and schedule is still being discussed and details worked out.		
	The Tinian and Rota master plans are both currently scheduled to be completed in June 2017.		
	Ms. Wendi Prater of the Commonwealth of the Northern Mariana Islands (CNMI) Commonwealth Ports Authority (CPA) is MN's designated point of contact.		
2	The USACE is preparing an Integrated Feasibility Study and Environmental Impact Statement (EIS) for Tinian Harbor and separately for Rota Harbor.		
	Tinian Harbor investigations include breakwater repair / replacement and increasing channel / basin depth.		

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Rota Harbor investigations are addressing adverse wave action within the channel and basin resulting in operational and cargo transportation inefficiencies. The revetted mole and channel are also being investigated.

USACE conducted some numerical modeling for a 2015 study under the Planning Assistance to States (PAS) program. As part of the current Feasibility Studies, the USACE will be using the existing data as well as conducting additional modeling (Boussinesq and spectral wave) of the existing conditions and potential alternatives using existing hindcast and wave buoy data.

In the USACE's use of the existing bathymetry data for Rota Harbor and Tinian Harbor, it was found that the major data gap at Rota Harbor is bathymetry of the shallow reef area adjacent to the harbor, and the shallow lagoon area on the opposite (southwest) side of the harbor.

The USACE Feasibility Studies for both harbors began in January 2016 and will be completed by January 2019 according to the USACE's prescribed three-year schedule.

The CNMI CPA is the local sponsor of the USACE Feasibility Studies and EIS. Ms. Maryann Lizama is the USACE's designated point of contact at CPA.

Mr. John Gonzalez of the Lieutenant Governor's Office is USACE's designated point of contact at the CNMI Lt. Governor's office.

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3

The U.S. Fish and Wildlife Service (USFWS) has conducted biological surveys of both Tinian Harbor and Rota Harbor. The studies for both harbors should be submitted to the USACE in October 2016. The USACE has offered to share the studies with the MN Team.

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4

A federal hydrographic survey of the harbor and entrance channel of Tinian Harbor and Rota Harbor was last completed in 2013 and a new survey is scheduled to be conducted later this year 2016. The surveys are jointly funded by CPA and USACE.

*Post meeting update: The USACE will use the hydrographic survey being performed by the MN Team for the Tinian Harbor and Rota Harbor master plans in lieu of conducting its own surveys.*

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5

A consultant has been selected to prepare the EIS for both harbors. The contract award is forthcoming.

For Rota Harbor, expansion of the harbor basin is being contemplated for the EIS.

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6

The Department of Defense (DoD) has shared future vessel requirements at Tinian Harbor. The USACE has not been told that any additional information is forthcoming.

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7

The USACE recommended close coordination between USACE and MN throughout MN's projects to ensure the analysis and conclusions are coordinated and do not result in contradictory conclusions between MN's Master Plans and the USACE's Feasibility Study and EIS. MN concurred.

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Item of concern is the timing of available information. USACE's Tentatively Selected Plan Milestone is currently scheduled for June 2017, same time as MN's final report.

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~ End *Notes of Meeting* ~



**DATE OF MEETING:** Tuesday, 25 October 2016 **TIME:** 10:00 a.m. CHST

**LOCATION:** Port of Saipan, Second Floor Conference Room **WRITTEN BY:** Moffatt & Nichol  
(D. Kokubun, C. Matson)

**PROJECT TITLE:** Tinian Harbor Master Planning Services (Project No. CPA-TS-001-15) and Rota West Harbor Master Planning Services (Project No. CPA-RS-001-15) **MN PROJECT:** 9538/9539

**SUBJECT:** On-Site Coordination Meeting

**PARTICIPANTS:** Commonwealth Ports Authority (CPA): Wendi Prater, Christopher Tenorio, JoyAnn Deleon Guerrero  
Moffatt & Nichol (MN): Dean Kokubun, Christopher Matson  
SSFM CNMI (SSFM): Jessie Arizala, Gregorio Castro, Denn Manglona, Roy Reyes, Edwin Simbulan  
Micronesia Environmental Services (MES): Nathan Johnson

**DISTRIBUTION:** Attendees

**REFERENCE DOCUMENTS:**

- Agenda
- U.S. Army Corps of Engineers' (USACE) Feasibility Report and Environmental Impact Statement (EIS) Milestone Schedule, provided by the USACE

#	ITEM	ACTION	DUE DATE
<b><i>CPA's vision for master plans for Tinian Harbor and Rota West Harbor</i></b>			
	A. Tinian Harbor		
	1. Deteriorated condition of piers and breakwater		
	2. Department of Defense's (DoD) plans and their potential impact to port operations		
	3. Fire hydrant(s) (seawater?) at the port to facilitate firefighting should be considered. Currently when tankers offload fuel, an airport fire truck is called upon to standby at the port.		
	4. Closing of Dynasty Hotel-Casino		
	5. Two proposed hotel-casinos, one by Bridge Investment Group (BIG) and one by Alter City Group Incorporated (ACG), including:		
1	a. Roll-on/Roll-off (RO/RO) plus passenger ferry service from Saipan		
	b. BIG lease of a significant portion of waterfront and backland areas of the port, including the Titanic-replica casino at the east end of the port. CPA to provide MN the conceptual sketches for the proposed development.	CPA	
	c. BIG will be constructing three new buildings for CPA on port property; CPA to provide MN the plans for the projects	CPA	
	6. Staging construction material at / near the port during near term construction projects at the port		
	7. Best Sunshine:		
	a. Yacht service from Saipan (two yachts already in Saipan; company plans to purchase three more)		
	b. Possible plans for a floating casino		
	8. Possible future direct flights from China and the potential impact to future cargo volumes		
	9. Funding the future port development		

B. Rota West Harbor

1. Addressing the active wave and current environment of the harbor and the on-going challenges with safe cargo delivery and offloading
2. Berth 2 may be experiencing undermining at its southwest corner. This will be investigated during MN's underwater inspection at the end of the week.
3. Possible future need to accommodate Best Sunshine's yacht service from Saipan (two yachts already in Saipan; company plans to purchase three more)
4. A RO/RO ramp may be useful at Rota West Harbor
5. Possible future direct flights from China and the potential impact to future cargo volumes
6. A new breakwater or harbor reconfiguration project may encounter significant environmental challenges
7. Funding the future port development

**Stakeholders and key interests**

2 It would be favorable to identify all key stakeholder, public and special interest groups early in the master planning process so potential key issues and concerns of those groups may be anticipated and considered through the master planning process. MN cautioned that many times stakeholders and special interests will reserve comment until near the end of the master planning process, after decisions have been made, direction has been taken, and plans have been developed when incorporating changes to address their concerns and interests is difficult. The Team should try to anticipate those concerns and consider them in developing the master plans.

**Stakeholder outreach**

- 3 A. CPA has coordinated a meeting with representatives from the shippers, stevedores, vessel captains, and other harbor users for Friday, 28 October 2016 at 10:00 a.m. CHST at the Port of Saipan Conference Room.
- B. CPA has coordinated a meeting with GHD, CPA's consultant for the Saipan Master Plan, for Friday, 28 October 2016 at 2:00 p.m. CHST at the Port of Saipan Conference Room.

**Data and record gathering**

- 4 A. CPA (W. Prater) is in the process of reviewing the data request from MN to determine which information requested has not yet been provided to MN. CPA will get back to MN with additional information that has not already been provided to MN. CPA
- B. Among the most urgent data / information required by MN is the cargo and passenger data and other information needed to prepare the cargo and passenger projections, the port financial data and funding options needed for the financial analyses, and a copy of the recently enacted wharfage law disallowing collection of wharfage fees for cargo offloaded in Rota and Tinian which originated in Saipan. MN will follow up with an e-mail to CPA (W. Prater) describing the cargo and passenger data, and financial and funding information that is needed. MN
- C. MN asked if CAD files of survey maps and other drawings are available. W. Prater will check with Fermin. CPA
- D. SSFM CNMI is available to assist with data gathering on island if the information needs to be searched and pulled.





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- E. MN requested a copy of the parcel maps of the Tinian and Rota West Harbor properties and adjacent properties that may be affected by future harbor development.
1. CPA will provide the parcel maps of its properties CPA
  2. MN should contact the Department of Public Lands (DPL) or Division of Land Surveys for parcel maps of properties outside of CPA's properties MN
  3. Since both harbor properties currently have a lot of unused land available for development, CPA will not be acquiring properties outside of those it currently owns for future harbor development / expansion. However, CPA leases land at both ports to others which CPA could reacquire, if necessary. CPA will identify those lands and provide a copy of the lease agreements for both harbors to MN. CPA
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**Project schedule (dates cited are for Saipan, CNMI)**

- A. Current project schedule:
- Notice to Proceed: 15 August 2016
  - Rota West Harbor metocean instrumentation and monitoring: August 2016 – February 2017 (including planning, data gathering, mobilization/demobilization); pending permit approvals
  - On-Site Meetings with CPA and first Public Information Meetings: week of 24 October 2016
  - Rota West Harbor condition assessment (dive inspection): 27 – 28 October 2016
  - Rota West Harbor bathymetric survey: 29 November – 03 December 2016 (including mobilization / demobilization)
  - Tinian Harbor bathymetric survey: 04 – 06 December 2016 (including mobilization / demobilization)
  - Draft Tinian Harbor Master Plan submittal: 20 February 2017
  - Draft Rota West Harbor Master Plan submittal: 01 May 2017
  - Second Public Information Meetings: week of 15 May 2017
  - Final Tinian Harbor Master Plan and Rota West Harbor Master Plan submittal: 05 June 2017
- 5 B. Since the USACE's Feasibility Study will only be reaching *Decision Point 2 - Concurrence on its Tentatively Selected Plan* on 13 June 2017 based on the schedule provided by the USACE, MN suggested that postponing the completion of both master plans until after concurrence of the USACE's Tentatively Selected Plans may be a good idea so CPA and MN have an opportunity to consider the USACE's plans before the CPA master plans are finalized.

CPA asked if completion of the CPA master plans is delayed until after the 13 June 2017 concurrence of the USACE's Tentatively Selected Plans, when will the Final Master Plans be completed. MN responded that completion of the Final Tinian Harbor Master Plan and Rota West Harbor Master Plans will likely be delayed about two months since the Second Public Information Meetings on each island should occur only after the USACE announces its Tentatively Selected Plans.

CPA asked if an extension of the CPA master plan schedules to accommodate the USACE's schedule would have a cost impact to the MN Team. MN responded that as long as the schedule extension is agreed upon at the start of

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the project so project spending can be adjusted for the longer project duration, there will be no increase in the MN Team's fees.

CPA requested a written request to adjust the schedule to better align with the USACE's schedule. A proposed revised schedule should accompany the written request. MN

If advanced copies of the Tentatively Selected Plans can be provided to CPA and MN by USACE as the plans are discussed and finalized, it would help to coordinate the CPA's master plan.

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***Miscellaneous items of discussion and notes***

- A. Rota West Harbor: Rota West Harbor Pier 1 is used for homeporting the M/V Luta
- 6 B. Rota West Harbor: Vessels offloading cargo at Rota West Harbor are required to clear its cargo at Pier 2
- C. Tinian Harbor: Saipan Stevedore provides all stevedoring at Tinian Harbor

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~ End Notes of Meeting ~



# AGENDA

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**Subject: Tinian Harbor Master Plan, Project No. CPA-TS-001-15  
Rota West Harbor Master Plan, Project No. CPA-RS-001-15  
Coordination Meeting  
Port of Saipan, Office of the Executive Director  
Tuesday, 25 October 2016, 10:00 a.m. ChST**

**M&N Job No.: 9538, 9539**

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1. CPA's vision for master plans for Tinian Harbor and Rota West Harbor, including:
  - A. CPA's expectations for the master plans
  - B. Critical issues and priorities for both harbors
  - C. New opportunities for both harbors
  - D. Funding considerations (e.g., sources, limitations, opportunities, etc.) and construction (work-to) budgets for full build out of master plans (if known)
  - E. Phasing considerations / key milestones (if any)
2. Stakeholders and key interests (i.e., individuals, government entities, businesses, others)
3. Stakeholder outreach, including vessel operators (M/V Luta and M/V Tug Mangilao)
  - MN would like to meet with tug captain and other harbor users
4. Data and records gathering
5. Project schedule – key dates (subject to change):
  - A. Notice to Proceed: 15 August 2016
  - B. Rota West Harbor metocean instrumentation and monitoring: August 2016 – February 2017 (inc. planning, data gathering, mobilization/demobilization); pending permit approvals
  - C. On-Site Meetings with CPA and first Public Information Meetings: week of 24 October 2016
  - D. Rota West Harbor condition assessment (dive inspection): 27 – 28 October 2016
  - E. Rota West Harbor bathymetric survey: 29 November – 03 December 2016 (inc. mob/demob)
  - F. Tinian Harbor bathymetric survey: 04 – 06 December 2016 (inc. mob/demob)
  - G. Draft Tinian Harbor Master Plan submittal: [20 February 2017](#)
  - H. Draft Rota West Harbor Master Plan submittal: [01 May 2017](#)
  - I. Second Public Information Meetings: [week of 15 May 2017](#)
  - J. Final Tinian Harbor Master Plan and Rota West Harbor Master Plan submittal: [05 June 2017](#)

\* Dates cited above are for Saipan, CNMI

## Milestone Schedule

SMART Task/Milestone	Completion Date
Execute FCSA	4-Dec-2015
Receive Federal Funds	4-Dec-2015
Receive Non-Fed Funds	4-Dec-2015
PDT Kickoff - Step 1: Probs&Opportunities	13-Jan-2016
Scoping Charette	18-Feb-2016
Complete Step 2: Inventory and Forecasting of Resources	30-May-2016
Complete Step 3: Alternatives Formulation (Complete)	12-Jun-2016
Federal Notice of Intent for Environmental Impact Statement (EIS)	8-Jul-2016
EIS Public Scoping Meeting	20-Jul-2016
<b>Decision Point 1 - Concurrence on Final Array of Alternatives</b>	<b>3-Aug-2016</b>
Complete Steps 4 & 5: Evaluate & Compare Alternatives (ROM Screening Level)	20-Nov-2016
IPR: Convert to Remote & Subsistence (if needed)	15-Jan-2017
Value Engineering Workshop & Schedule IPR/TSP Meeting	19-Mar-2017
Complete Step 6: Initial Selected Plan	22-Mar-2017
IPR: Discussion of any issues/outcomes of VE Workshop	26-Mar-2017
Compile Draft Feasibility/EIS Integrated Report	3-May-2017
Submit TSP Read-Aheads to POD	16-May-2017
PDT Review of Draft Feasibility/EIS Integrated Report	17-May-2017
Submit TSP Read-Aheads to HQ	23-May-2017
POH District Quality Control, Legal Sufficiency, and Sponsor Review (End)	12-Jun-2017
<b>Decision Point 2 - Concurrence on Tentatively Selected Plan</b>	<b>13-Jun-2017</b>
Federal Notice of Availability	1-Jul-2017
Draft Feasibility/EIS Integrated Report Published	17-Jul-2017
Public Hearing	20-Jul-2017
ATR of Draft Feasibility/EIS Integrated Report Complete (30 days)	18-Aug-2017
Public Cmment Period Complete (45 days)	31-Aug-2017
Planning Workshop w/ Key Stakeholders - Addressing Comments & Revising Document	26-Sep-2017
Independent External Peer Review (IEPR) Complete (90-120 days)	31-Oct-2017
<b>Decision Point 3 - Agency Decision Milestone</b>	<b>19-Jan-2018</b>
Final FR/EIS Completed	16-Feb-2018
Final FR/EIS District Quality Review	2-Mar-2018
Final FR/EIS ATR complete (includes Cost ATR)	6-Apr-2018
IPR: Confirm Appropriate to initiate process for Decision Point 4	18-May-2018
DE Signs Final FR/EIS	21-May-2018
<b>Decision Point 4 - Final Report Milestone</b>	<b>25-May-2018</b>
Final FR/EIS POD Review	8-Jun-2018
POD Commander Transmittal to HQUSACE	25-Jun-2018
Final FR/EIS HQUSACE Review	11-Jul-2018
Civil Works Review Board	27-Aug-2018
DGC-CEO Release Report for Commonwealth and Agency Review	26-Sep-2018
Commonwealth & Agency Review of FR/EIS complete (30 days)	26-Oct-2018
HQUSACE Prepares Final Chief's Report	12-Nov-2018
<b>Decision Point 5 - Chief's Report to ASA (CW)</b>	<b>27-Nov-2018</b>

**DATE OF MEETING:** Thursday, 27 October 2016 **TIME:** ~11:30 a.m. CHST

**LOCATION:** Tinian International Airport  
Office of the Tinian Ports Manager **WRITTEN BY:** Moffatt & Nichol  
(D. Kokubun, C. Matson)

**PROJECT TITLE:** Tinian Harbor Master Planning Services (Project No. CPA-TS-001-15) **MN PROJECT:** 9538

**SUBJECT:** Coordination Meeting with Tinian Ports Manager

**PARTICIPANTS:** Commonwealth of the Northern Mariana Islands (CNMI) Commonwealth Ports Authority (CPA):  
Joseph Mendiola, Gerry Chrisostomo  
Moffatt & Nichol (MN): Dean Kokubun, Christopher Matson  
SSFM CNMI (SSFM): Gregorio Castro

**DISTRIBUTION:** Attendees; Wendi Prater (CPA)

**REFERENCE DOCUMENTS:** None

#	ITEM	ACTION	DUE DATE
	<b>Bridge Investment Group (BIG) development</b>		
1	<ul style="list-style-type: none"> <li>Bridge Investment Group (BIG) has applied for permits for the construction of a new hotel and casino at the port. The development would occupy roughly a third of the southern section of the existing port property. The site has already been fenced off and the former operations building inland of the wharf has already been demolished. BIG is currently constructing three buildings for CPA at the port to accommodate port operations that will be affected by the construction of BIG's new development. Permits are currently being sought by BIG for construction of the hotel and casino.</li> <li>A priority for BIG is the initiation of roll on/roll off (RO/RO) and passenger ferry service between Saipan and the proposed new hotel and casino</li> <li>The ferry is envisaged to homeport in Tinian along the length of the Tinian wharf secured by BIG</li> </ul>		
	<b>Alter City Group (ACG) development</b>		
2	<ul style="list-style-type: none"> <li>Alter City Group (ACG) has obtained permits and is set to begin construction of a new hotel and casino in Puntan Diablo at the end of the year</li> <li>ACG hopes to run a RO/RO and passenger ferry between Saipan and Tinian Harbor</li> <li>A Saipan-Tinian ferry used to run out of Sugar Dock on Saipan but service stopped a few years ago. Sugar Dock has since been condemned.</li> </ul>		
	<b>Department of Defense (DoD)</b>		
3	<ul style="list-style-type: none"> <li>U.S. Navy has expressed a need to use the harbor 36 weeks out of the year</li> <li>U.S. Air Force has expressed a need to use the harbor 11-12 weeks out of the year</li> <li>Explosive Safety Quantity-Distance (ESQD) will need to be considered during off loading and staging of munitions at the port. To date, however, specific information has not been provided to CPA by DoD regarding the quantity of</li> </ul>		

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explosives, planned operations, ESQD standoff distance arcs, etc. on which CPA may base its planning.

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**Small boat marina**

- 4
- The small boat facility to the northwest of the commercial piers is operated by the CNMI Department of Lands and Natural Resources, Fish and Wildlife Division (DLNR) but the marina and land is owned by CPA
- 

**Free Trade Zone (FTZ)**

- 5
- The CPA already has the authority to designate and establish a Free Trade Zone (FTZ) although it has not yet designated one
  - An FTZ near the northern end of the Tinian Harbor breakwater has been discussed within CPA. A conceptual plan can be obtained by MN from J. Mendiola. MN
  - An FTZ near the Tinian International Airport has also been discussed within CPA
- 

**Port of Tinian comments**

- 6
- Federally authorized dredge depth of channel = 35 feet; current depth of channel = approx. 30 – 35 feet
  - Federally authorized dredge depth of turning basin = 28 feet; current depth of turning basin = approx. 24 feet
  - The closing of Tinian Dynasty Hotel & Casino has had a significant impact on visitors and cargo volumes on Tinian
  - Based on current fuel delivery, Tinian has approx. 45 days of fuel available to power its power plant. The Tinian power plant is currently producing approx. 2.5MW of peak energy although it was producing approx. 5MW of electricity while the Tinian Dynasty Hotel & Casino was operating. Currently, International Broadcasting Bureau (IBB) / Voice of America (VOA) is a primary power purchaser on Tinian.
  - A new wastewater treatment plant outside of the CPA harbor property on Commonwealth Utilities Corporation (CUC) property has been proposed. More information can be obtained by MN from J. Mendiola. MN
  - Cruise ships calling Tinian Harbor was discussed while the Tinian Dynasty Hotel & Casino was still operating. The Port of Tinian still receives occasional calls from cruise ship companies inquiring about the depth of the channel and harbor but after the depths are conveyed, the discussion stops. CPA assumes the depth of the existing channel and harbor may not be favorable to the cruise ship companies.
- 

~ End Notes of Meeting ~



**DATE OF MEETING:** Thursday, 27 October 2016 **TIME:** ~1:30 p.m. CHST

**LOCATION:** Tinian International Airport **WRITTEN BY:** Moffatt & Nichol  
Office of the Tinian Ports Manager (D. Kokubun, C. Matson)

**PROJECT TITLE:** Tinian Harbor Master Planning Services (Project No. CPA-TS-001-15) **MN PROJECT:** 9538

**SUBJECT:** Meeting with Alter City Group Incorporated (ACG)

**PARTICIPANTS:** Commonwealth of the Northern Mariana Islands (CNMI) Commonwealth Ports Authority (CPA):  
Joseph Mendiola, Wendi Prater, Gerry Chrisostomo  
Alter City Group Incorporated (ACG): Nikkonnia Quichocho  
Moffatt & Nichol (MN): Dean Kokubun, Christopher Matson  
SSFM CNMI (SSFM): Gregorio Castro

**DISTRIBUTION:** Attendees

**REFERENCE DOCUMENTS:** None

#	ITEM	ACTION	DUE DATE
	Alter City Group (ACG) has obtained permits and is set to begin construction of a new hotel and casino in Puntan Diablo in December 2016 or the first quarter of 2017, dependent on notice to proceed approval.		
1	The earthmoving permits and notice to proceed for Phase 1A and Phase 1B have been issued. The master siting permit for grubbing and full scale clearing is currently being reviewed. ACG hopes to have this permit approved by November 2016.		
	ACG is seeking to incrementally hire 200 persons for the first group of workers until construction gets into full swing. It expects that a total of 700 – 1000 workers will eventually be needed at the height of the project construction. Workers will be housed in temporary worker housing. The CNMI-Only Transitional Worker (CW-1) Cap is making the hiring of skilled workers difficult but other strategies to hire the manpower needed for the construction are being undertaken.		
	ACG hopes to run a RO/RO and passenger ferry between Saipan and Tinian Harbor. ACG has hired a ferry consultant.		
2	ACG envisages the ferry to homeport in Tinian. A ferry terminal would be needed in Tinian to process passengers. It is unlikely that shared use of the ferry terminal being proposed by Bridge Investment Group (BIG) would be feasible since BIG's terminal would be on land that will be leased by BIG.		
	ACG would provide bus shuttle service between Tinian Harbor and its hotel and casino.		

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The RO/RO ferry for ACG's new service is envisaged to be similar to the ferry that operated when the Dynasty Hotel & Casino was in business. MN requested the specifications of the ferry vessel that ACG anticipates using for the service. N. Quichocho will send the specifications to MN after the meeting.

The ACG RO/RO ferry will accommodate passenger vehicles as well as walk-on passengers, but will not have room or clearance for buses and trucks.

CPA and ACG was not sure if the "Jones Act" (i.e., the Merchant Marine Act of 1920) requiring that all goods transported by water between U.S. ports be carried on U.S.-flagged ships, constructed in the U.S., owned by U.S. citizens, and crewed by U.S. citizens and U.S. permanent residents applied to the ferry vessels and service that is being proposed for the Saipan-Tinian route. It is ACG's understanding that if a foreign-made vessel is inspected and certified to meet the necessary standards, the vessel would be okay to operate. CPA will research and respond to MN.

CPA

*Post-meeting note:* Following the meeting, N. Quichocho e-mailed the following information related to the vessel ACG is currently looking to acquire for the Saipan-Tinian service.

Principal Dimensions:

- Length Overall: 38.70 m
- Length (Waterline): 35.60 m
- Beam (molded): 11.50 m
- Hull Depth (molded): 3.70 m
- Hull Draft: 1.30 m

Specifications:

- Clearance Height (Mast Dropped): 9.50 m
- Load Draught: 1.30 m
- Loaded Displacement: 155.28 T
- Gross Tonnage: 458.00 T
- Dead weight: 137.00 T
- Free Board: 2256 mm
- Fuel Tankage: 10400 L
- Fresh Water Tank: 1500 L
- Hydraulic Tankage: 160 L
- Sewage Tankage: 160 L
- Passengers: 358
- Crew: 14
- Draught Bow: 1,277 m
- Draught Tail: 1,303 m
- Maximum Load: 43.56 T
- Maximum Height of Water Line: 13.50 m
- Maximum Height after Mast Dropped: 9.5 m

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3

Beginning on 01 October 2016, the U.S. federal government began enforcement of provisions of the *Federal Mine Safety and Health Act of 1977* which establishes mandatory health and safety standards that govern the nations' mines. Since the

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local Tinian quarries do not currently comply with all the required provisions, local aggregate for concrete is currently not available on Tinian.

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- 4 The CPA has been granted the right to establish Free Trade Zone (FTZ) on Tinian. However, CPA has not yet designated a site. ACG expressed initial interest if / when warehousing in an FTZ it is established.
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~ End *Notes of Meeting* ~



**DATE OF MEETING:** Thursday, 27 October 2016 **TIME:** ~2:30 p.m. CHST

**LOCATION:** Bridge Investment Group, LLC (BIG)  
520800 San Jose Street, Suite 101, Tinian MP 96952 **WRITTEN BY:** Moffatt & Nichol  
(D. Kokubun, C. Matson)

**PROJECT TITLE:** Tinian Harbor Master Planning Services (Project No. CPA-TS-001-15) **MN PROJECT:** 9538

**SUBJECT:** Meeting with BIG to Discuss Tinian Harbor Master Plan

**PARTICIPANTS:** Commonwealth of the Northern Mariana Islands (CNMI) Commonwealth Ports Authority (CPA):  
Joseph Mendiola, Wendi Prater  
Bridge Investment Group, LLC (BIG): Philip Mendiola-Long, Trenton Conner, and other BIG  
representatives  
Moffatt & Nichol (MN): Dean Kokubun, Christopher Matson  
SSFM CNMI (SSFM): Gregorio Castro, Denn Manglona, Roy Reyes

**DISTRIBUTION:** Attendees

**REFERENCE DOCUMENTS:** • Seatransport ferry specifications sheet and renderings (15 sheets)

#	ITEM	ACTION	DUE DATE
1	<p>Bridge Investment Group, LLC (BIG) is in the process of seeking permits for the construction of a new hotel and casino at the port. The development would occupy roughly one-third of the North Quay and existing port property.</p> <p>BIG's design has progressed through the design development phase but BIG is awaiting permits and other approvals before moving into construction documents. The current development plan is contingent upon the ability to close the Federal Highways Administration (FHWA) road that currently bisects the BIG site.</p> <p>Phase 1 of BIG's proposed development is the initiation of roll on/roll off (RO/RO) and passenger ferry service between Saipan and Tinian.</p> <p>T. Conner is CEO of the ferry company. BIG is a shareholder of the ferry company but the ferry company will be independent of the hotel and casino operations.</p> <p>A specifications sheet and renderings of a ferry the company is currently looking into acquiring for the new Tinian-Saipan service was provided by BIG (attached).</p>		
2	<p>Based on conceptual sketches reviewed during the meeting, a retractable mooring structure would extend from the North Quay for mooring the ferry at berth and the ferry is outfitted with a stern ramp to support RO/RO capability.</p> <p>BIG stated that the CNMI is exempt from the "Jones Act" (which requires that goods transported between U.S. ports be carried on U.S.-flagged ships, constructed in the U.S., owned by U.S. citizens, and crewed by U.S. citizens and U.S. permanent residents).</p>		

The company would like to initiate ferry service between Saipan and Tinian in March 2017.

The BIG ferry would be open to the public and other businesses so use of the ferry would not be limited to only BIG's operations.

3 Phase 2 of BIG's proposed development is the construction of the hotel in the northwest corner of the leased property. BIG is hoping to begin construction in June 2017 and estimates construction of the hotel to require approx. 16-months.

4 Phase 3 of BIG's proposed development is the construction of the Titanic-replica casino, water features, and other support structures.

5 BIG is also looking into the feasibility and viability of mooring a temporary 180-room floating hotel and casino at North Quay Berth 1 after the implementation of Phase 1.

6 BIG is currently constructing four buildings for CPA at the port to accommodate port operations that will be affected by BIG's proposed new development.

7 BIG expects to have an estimate of the quantity of construction materials needed for the proposed new hotel and casino development available in December 2016 / January 2017. BIG anticipates construction material for its hotel and casino to be shipped directly from China rather than transshipped through Saipan.

8 Supply projections for the hotel and casino development are being prepared for BIG by Windham Hotels.

9 BIG envisions a future market for cruise ship visits direct from Shanghai to Tinian.

10 BIG is concerned about the impact that cargo and military operations at the commercial port may have on the experience of its hotel and casino guests. BIG is reviewing sight lines from the proposed hotel and casino and considering plans for mitigating sight line concerns.

11 BIG has commissioned a study to assess the impact of the proposed ferry operation on coral. The study should be completed within a month.

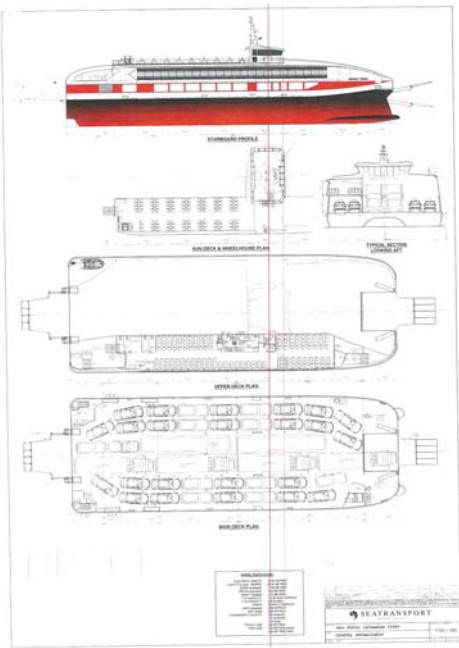
12 BIG understands that CPA already has the authority to designate and establish a Free Trade Zone (FTZ) although it has not yet designated one. 24-hour bonded warehousing in an FTZ would be attractive if / when it is established.

13 MN requested a copy of concept plans and any other marketing information related to the proposed new BIG hotel and casino development which BIG could release to the CPA and the MN Team at this time.

BIG

~ End Notes of Meeting ~









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**DATE OF MEETING:** Thursday, 27 October 2016 **TIME:** ~6:30 p.m. CHST

**LOCATION:** Tinian Courthouse **WRITTEN BY:** SSFM CNMI (E. Simbulan);  
Moffatt & Nichol  
(D. Kokubun)

**PROJECT TITLE:** Tinian Harbor Master Planning Services **MN PROJECT:** 9538  
(Project No. CPA-TS-001-15)

**SUBJECT:** Public Information Meeting

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**PARTICIPANTS:** Commonwealth Ports Authority (CPA): Joseph Mendiola, Gerald Crisostomo  
Moffatt & Nichol (MN): Dean Kokubun, Christopher Matson  
SSFM CNMI (SSFM): Gregorio Castro, Roy Reyes, Denn Manglona

See attached *Public Information Meeting - Sign-In Sheet*

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**REFERENCE DOCUMENTS:**

- Tinian Harbor Master Plan (CPA-TS-001-15) Meeting Presentation, dated October 27, 2016 (7 sheets)

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## ITEM

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### **Introduction**

- A. Opening remarks were made by CPA Tinian Ports Manager, Mr. Joseph Mendiola
  - B. Opening statement / comments from The Honorable Joey P. San Nicolas, Mayor of Tinian
    1. Mayor's Office supports Master Plan
    2. Master Plan should consider:
      - Alternative finger pier design
      - Breakwater repair / modifications
      - Port that can handle shipment for all types of uses (private, construction, commercial, etc.)
      - Bridge Investment Group (BIG) lease
    3. United States Army Corps of Engineers (USACE) is performing a study on the breakwater and harbor depths
- 

### **Presentation (by Moffatt & Nichol)**

See presentation provided herewith

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### **Public and Stakeholders' Question / Comments**

- A. Concern was offered over the deterioration of the existing piers that extend into the harbor
  - B. Concern was offered regarding the existing piers and the restrictions they present to the maneuverability (turning radius) of bigger ships within the harbor
  - C. Concern was offered on the deterioration of the existing breakwater
    - The restoration of the water break will reduce the risk of damage not only to a mitigated harbor (quay) but physical private and government properties as well
  - D. Request to consider an access point or opening in the north / west side of the existing breakwater to allow free flow of small vessels to the marina even during commercial or military operations at the main quay
  - E. Consideration should be given to a fuel dispensing facility close to the marina
    - If the current fuel farm needs to be relocated due to the proposed Titanic Hotel, consider relocating it closer to the marina
  - F. Concern was offered over unexploded ordnance (UXO) in the harbor
    1. UXO has been found off Berth 1 of the North Quay
    2. It was recommended that the Office of Economic Adjustment (Gary Kuwabara) be contacted since annual grants are available for the adjustments of impacts due to military activities
    3. It was also recommended that Derek Chow of the USACE be contacted regarding UXO in the harbor
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4. Brownfield grants were recommended to be considered as a means to fund the identification and removal of UXO
  5. Private consultant AMPRO Guam was mentioned to have conducted the most recent UXO retrieval operation at the harbor
- G. Concern was offered on the widening of the inner harbor and its effect on small vessel operations
- MN confirmed that the master plan, including the small vessel operations and access to the marina, will be considered and coordinated with the USACE
- H. Concern was offered regarding the lack of fire hydrants / firefighting capability at the harbor
- CPA Tinian mentioned that a draft proposal for a salt-water fire hydrant system is in the works. Funding is being sourced for the hydrant project.
- I. Request to consider public access and use of the harbor
2. Fishing area / access
    - Especially for seasonal fish like mackerel (Atulai)
  3. Fish cleaning / washing areas
  4. Picnic / BBQ areas, tables and benches
  5. Parking areas
  6. Berthing areas for private boats
  7. Boat rinse / washing area
  8. Fish weighing scale
- J. Question on stevedoring requirements for small vessels
- Question: Can small boat owners conduct their own stevedoring at the marina without being required to use the main dock?
  - Response: CPA clarified that all hazardous materials and products from outside the CNMI are required to be offloaded at the main dock. All vessels offloading cargo at the main dock are required to use the exclusive stevedore.
- K. Request to consider future development of sewage treatment system on Tinian. If a sewage pipe needs to be run through the harbor to outfall outside the harbor, it should be considered in the Master Plan.
- L. Recommendation for the Master Plan to consider the four Environmental Impact Statements that have already been prepared for Tinian related to the proposed military activities
1. BIG offered to share photos of arrival / demobilization of military cargo ships of the previous military exercise and training operations
  2. All military equipment for training is moved through the port. Military cargo information should be available from the Port of Saipan.
- M. Concern was offered regarding vessel berth times and berth availability
1. It was mentioned that stevedoring operations can be time consuming
  2. It was also mentioned that only two ships can be berthed at one time. If three ships are in port, one will have to remain at anchor.
- N. Estimated quantities of goods / commodities arriving on Tinian
1. 80% of commodities arrive through the small boat marina from Saipan
  2. 20% of other goods come through the main (commercial) dock
    - Usually hazardous materials
    - Products from outside CNMI
- O. Question whether the incinerator will be rebuilt at the harbor
- It was recommended that if the incinerator is rebuilt at the harbor, its location in relation to the proposed Titanic Hotel needs to be considered
- 

~ End Notes of Meeting ~





# TINIAN HARBOR MASTER PLAN (PROJECT NO. CPA-TS-001-15)

## Public Information Meeting - Sign-In Sheet




Tinian Court House, Thursday, 27 October 2016, 6:00 p.m. - 8:00 p.m.

#	NAME	AGENCY / COMPANY (as applicable)	PHONE (optional)	E-MAIL (optional)
1	LINDA V. LIANA		287-1831	
2	GERALD CRISOSTOMO	CPA	433-9294	gkcrisostomo@cpa.gov.mp
3	ROSALINA LAZARO	CPA	433-9493	rosalina_lazaro82@yahoo.com
4	HENRY H. SAN NICOLAS	SN-5	433-0391	senatorchandia@yahoo.com
5	JP SAN NICOLAS	MOT	783-4007	jp-tinian@gmail.com
6	Raamon De la Cruz	Private	285-2015	reelhooker2015@gmail.com
7	Phillip Mendola Long	Bridge Investment Group	989 4711	phil@bridgeinvestmentusa.com
8	MARTIN CONNER	TINIAN SUPERIOR COURT	433-3416	martin.conner@justice.gov.mp
9	Jose Cruz	BICG	783-2674	gurako2013@gmail.com
10	Diana H. Borja		286-1955	dhborja@yahoo.com
11	Ray Pangelinan	Bridge Invst Group	783-0420	tinianconstruction.r.pangelina@gmail
12	Alexis Hofschneider	Tinian Mayor's Office	285-6166	alexishofschneider@gmail.com
13				
14				
15				

# Tinian Harbor Master Plan (CPA-TS-001-15)

Commonwealth Ports Authority  
Commonwealth of the Northern Mariana Islands  
Public Information Meeting

October 27, 2016

## Meeting Agenda

- Welcome and introductions
- Purpose and scope of master plan study
- Schedule of master plan study
- Key issues for Tinian Harbor – audience input session







## Welcome & Introductions

- Joseph Mendiola, Tinian Ports Manager
- CNMI government and CPA representatives and other distinguished guests
- Moffatt & Nichol – port planning and engineering consultant to Commonwealth Ports Authority
  - Dean Kokubun, Project Manager
  - Christopher Matson, Senior Port Planner
- SSFM CNMI – civil engineering subconsultant and local coordinator to Moffatt & Nichol
  - Greg Castro, Liaison
  - Roy Reyes, Civil Engineer, PE
  - Denn Manglona, Civil Engineer
- Micronesian Environmental Services – environmental and permitting subconsultant to Moffatt & Nichol




## Purpose and Scope of Master Plan Study



- Conduct public and stakeholder meetings to solicit input and feedback from the general public and key stakeholders
- Review available existing information – i.e., prior CPA Master Plans, reports, studies, surveys, financial data and records, record drawings
- Conduct hydrographic survey of harbor and entrance channel
- Identify the federal and local environmental entitlements and permits required to implement the Master Plan and develop a realistic timeframe and budget for the environmental entitlement process
- Prepare a cargo and use forecast, future harbor operations analysis, logistics cost analysis, and concept-level cost and financial feasibility analyses
- Prepare a development plan, including submerged land improvements (i.e., dredging, harbor configuration, breakwaters, structural rehabilitation and improvements) and upland improvements (yard, utilities, buildings, and other upland infrastructure)
- Develop schedule and opinion of probable construction cost to implement development plan
- Prepare Tinian Harbor Master Plan Study

## Schedule of Master Plan Study

- Key Milestone Dates\*:
  - October 27, 2016: First Public Information Meeting
  - November 2016: Hydrographic survey of harbor
  - February 2017: Draft Master Plan submittal to CPA
  - March 2017: CPA review and comment on Draft Master Plan
  - May 2017: Second Public Information Meeting
  - June 2017: Final Master Plan submittal to CPA

\*Dates subject to change

## Key Issues for Tinian Harbor

- Deterioration of existing piers and wharves
- Deteriorated breakwater, future navigation improvements (coordinate with U.S. Army Corps of Engineers feasibility study and environmental impact statement)
- Dredging of berths (existing harbor dredge depth = -28') and navigation channel (existing channel depth = -35')
- Identification and coordination of potential upland and in-water opportunities:
  - In-Water:
    - Future ferry and cruise opportunities
    - U.S. Department of Defense
  - Upland:
    - Two new warehouses and new operations building to be constructed soon
    - Maximize utility of existing vacant port land
    - New hotel and casino on adjacent property
- Others – from meeting participants




**DATE OF MEETING:** Friday, 28 October 2016 **TIME:** 9:00 a.m. CHST

**LOCATION:** Port of Saipan Conference Room **WRITTEN BY:** Moffatt & Nichol  
(D. Kokubun, C. Matson)

**PROJECT TITLE:** Tinian Harbor Master Planning Services (Project No. CPA-TS-001-15) and Rota West Harbor Master Planning Services (Project No. CPA-RS-001-15) **MN PROJECT:** 9538/9539

**SUBJECT:** Meeting with Tinian and Rota West Harbor Commercial Users

**PARTICIPANTS:** See attached Sign-In Sheet

**DISTRIBUTION:** Attendees; Joseph Mendiola, Martin Mendiola, Wendi Prater (CPA)

**REFERENCE DOCUMENTS:** Sign-In Sheet

#	ITEM	ACTION	DUE DATE
	<b>Port of Rota</b>		
1	<ul style="list-style-type: none"> <li>• There is a large rock at the north end of Pier 2 that should be removed</li> <li>• Fuel is typically delivered to Rota every 40 days; Mobil could increase frequency, if needed</li> <li>• Additional wharf lighting would be beneficial since CPA currently does not allow cargo to be loaded / offloaded at night. For tug and barge operations, the tug could light the “dark” side of the barge but CPA still would not allow cargo to be offloaded at night.</li> <li>• Navigating Rota West Harbor:               <ul style="list-style-type: none"> <li>○ Navigating the harbor is only done during daylight hours, from dusk till dawn; navigating at night is not done due to safety concerns</li> <li>○ The two sets of two pipes that penetrate the causeway at the rear of the harbor, at the south end of the small boat marina, affect the currents within the commercial harbor</li> <li>○ The decision of whether or not to attempt to bring a vessel into the harbor is dependent on observations of the ship’s crew, communication with port personnel on shore, and largely on the experience and feel of the vessel pilot</li> <li>○ Swells greater than approx. 3 feet make it difficult to navigate the channel and harbor</li> </ul> </li> <li>• The M/V Luta has bow thrusters only</li> <li>• It was opined that new engineered fenders and bollards along Berth 1 and Berth 2 would make berthing and mooring safer for vessels and vessel and port personnel during cargo operations</li> </ul>		
	<b>Port of Tinian</b>		
2	<ul style="list-style-type: none"> <li>• Dredge depth greater than 30 feet in the harbor basin would be favorable</li> <li>• Tinian has a 120 ton Tadano crane</li> <li>• Typical offloading operations at Tinian Harbor:               <ol style="list-style-type: none"> <li>1. Land at dock; load containers on chassis with crane</li> <li>2. A typical load currently consists of two, 40’ containers but a typical load when the Dynasty Hotel &amp; Casino was operating was three-to-four, 40’ containers</li> </ol> </li> </ul>		

- 
3. There are two, 40' chassis on-island
  4. Break bulk cargo is also common
  5. Remove empties
- The U.S. Coast Guard (USCG) mandates that all potentially hazardous cargo shall be offloaded at the commercial port and shall not be offloaded at the small boat marina just north of the commercial port. Currently, non-hazardous cargo is allowed to be imported through the small boat marina but it is not regulated nor inspected and no wharfage, dockage or stevedoring fees are collected on the imported cargo.
  - Pacific Marine Enterprises Inc.'s *Pacific Marine I* currently moors along the west side of the Connecting Pier
  - GPPC's *M/V Jayden* currently moors along North Quay Berth 1
  - The *Thunder & Lightning* – a RO/RO vessel - and *Ocean Freedom* – a bulk carrier with three deck cranes – were chartered by the Department of Defense / Military Sealift Command (MSC) and are the largest vessels to recently call the port
  - The U.S. Army Corps of Engineers / Seabridge performed the most recent maintenance dredging of the channel and harbor
  - Master plan needs to consider the underground fuel pipe line extending from the manifold along North Quay Berth 2 to the upland fuel tanks
  - Mooring lines currently rub against the existing concrete barriers set between the bollards and the wharf. It was stated that the barriers were placed per USCG regulations.
  - Wharf lighting is currently inoperable. Harbor users requested that the inoperable lights be investigated and addressed as a high priority operational need. If wharf lighting was available during the recent Department of Defense cargo offloading operation, the cargo could have been offloaded during non-daylight hours and completed much more efficiently. It was stated that it is suspected that the electrical wiring had been removed from the existing light towers.
  - Firefighting capability (i.e., fire hydrants) at the wharf would be extremely beneficial. Currently when tankers offload fuel, an airport fire truck is called upon to standby at the seaport.
  - Shoreside water would be beneficial and could be sold to visiting vessels

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3 It was estimated that approx. 11 dedicated ships have called Saipan to deliver construction material for the new Saipan hotel and casino to date

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4 A Facilities Security Plan is currently being prepared at the request of the USCG. This plan is necessary to accommodate the arrival of ferry passengers and vehicles at a commercial cargo port.

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5 If ferry service is to be considered between Saipan and Tinian / Rota, a viable port of call on Saipan needs to be identified. The prior ferry services was run out of Sugar Dock on Saipan but the facility has since been condemned. The Port of Saipan's commercial terminal does not seem to have available berth nor wharf space to accommodate an interisland ferry service. It was noted that David Dougherty owns land adjacent to the Port of Saipan where a dock could be built from which the ferry service may be launched. It was suggested that the companies proposing the ferry service reach out to Mr. Dougherty.

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~ End Notes of Meeting ~



Rofa/Tinian - master plan

COMMONWEALTH PORTS AUTHORITY  
PORT OF SAIPAN

EVENT: \_\_\_\_\_

DATE: 10/28/14

TIME: 0900-

NO.	NAME	COMPANY	TEL. NO.	FAX. NO.	EMAIL
1	Lee Cabrera	Saipan Stevedore	670-322-9240		lee.cabrera@saistevco.com
2	MIKE HARKREADER	LUTA MERMAID LLC	670-989-1511		MIKEYHARKY@gmail.com
3	JESSIE ARIJATA	SSFMC CNMI	233-7770	233-7771	jarijata@ssfmcnmi.com
4	GREGORIO Q. CASTRO	SSFMC CNMI	233-7770/2	233-7771	gcastro@ssfmcnmi.com
5	CHRISTOPHER MATSON	MOFFATT & NICHOL	(757) 404 6600		CMATSON@MOFFATTNICHOL.COM
6	Michael Demapan	Saipan Stevedore	670-989-1011		demapan@gmail.com
7	Guillermo Jaller	Saipan Marine Corp.	670-322-7345	322-7347	gjaller@saipanmarine.com
8	BANZUELA, BONG	NORTON LILLY	670-322-9978	322-9979	SAIPAN-OPS@NORTONLILLY.COM
9	Anthony Camacho	CPA	664-8556	322-4710	anthony.camacho@cpa.gov.mp
10	MATT BUENABAJU	INCHCAPE SHIPPING	322-4777	322-4779	iss.saipan@issshipping.com
11	ERIK RAIBANG	AMIZYPA SAIPAN	322-0970	322-0977	OS@AMIZYPA-Saipan.com
12	John H.B. Sabar	Saipan Marine Corp	888-5628		
13	DANIEL MENSANA	SAIPAN SHIPPING CO. INC	670-287-6376		OPERATIONS@SAIPANSHIPPING.COM
14	DEAN KOKUBUN	MOFFATT & NICHOL	808-533-7000		DKokubun@MoffattNichol.com
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**DATE OF MEETING:** Friday, 28 October 2016 **TIME:** 2:00 p.m. CHST

**LOCATION:** Port of Saipan Conference Room **WRITTEN BY:** Moffatt & Nichol  
(D. Kokubun, C. Matson)

**PROJECT TITLE:** Tinian Harbor Master Planning Services (Project No. CPA-TS-001-15) and Rota West Harbor Master Planning Services (Project No. CPA-RS-001-15) **MN PROJECT:** 9538/9539

**SUBJECT:** CPA Master Plans Coordination Meeting

**PARTICIPANTS:** Commonwealth Ports Authority (CPA): Wendi Prater  
Moffatt & Nichol (MN): Dean Kokubun, Christopher Matson  
SSFM CNMI (SSFM): Edwin Simbulan  
GHD: Fred Smith, Richard Hill (via teleconference)

**DISTRIBUTION:** Attendees

**REFERENCE DOCUMENTS:**

#	ITEM	ACTION	DUE DATE
	<b><i>Saipan Harbor Master Plan</i></b>		
1	<ul style="list-style-type: none"> <li>• GHD is in the process of collecting and reviewing data that will feed into its cargo and passenger forecasts. Initial cargo and passenger projections will be available in November 2016.</li> <li>• Saipan Master Plan will consider:               <ul style="list-style-type: none"> <li>○ existing port operations</li> <li>○ anticipated growth of the tourism sector</li> <li>○ Saipan's new hotels and casinos</li> <li>○ a dedicated cruise terminal</li> <li>○ recreational boats and yachts</li> <li>○ Department of Defense cargo transhipped out of Saipan</li> </ul> </li> <li>• A bathymetric survey of Saipan harbor will be conducted in December 2016</li> </ul>		
	<b><i>Tinian and Rota West Harbor Master Plans</i></b>		
2	<ul style="list-style-type: none"> <li>• Master planning process for Tinian and Rota West Harbor have just begun. MN has begun gathering and reviewing existing records, data, drawings, reports, studies, etc. from CPA.</li> <li>• Information gathering meetings with CPA and harbor stakeholders were conducted over the week (week of 24 October)</li> <li>• Public Information Meetings on Rota and Tinian were held on Wednesday (26 October) and Thursday (27 October)</li> <li>• An MN structural dive inspection team is performing an under and above water inspection of the Rota West Harbor today (Friday, 28 October 2016)</li> <li>• A bathymetric survey of Rota West Harbor and Tinian Harbor will be conducted in late November / early December 2016</li> <li>• Initial feedback from this week's meetings included:               <ul style="list-style-type: none"> <li>○ For Rota West Harbor, the wave and current conditions in the harbor are primary issues of concern</li> <li>○ For Tinian Harbor, the proposed new hotels and casinos will bring a significant volume of construction cargo to the island in the near term and</li> </ul> </li> </ul>		

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the port will need to accommodate supply cargo and ferry service from Saipan for the new facilities.

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3 CPA encouraged the exchange of information between MN and GHD as the master plan projects progress. Wendi Prater shall be "Ccd" on all e-mail correspondence between MN and GHD.

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MN and GHD shall distribute its respective project schedules.

MN/GHD

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~ End *Notes of Meeting* ~



**DATE OF MEETING:** Friday, 28 October 2016 **TIME:** 3:00 p.m. CHST

**LOCATION:** Port of Saipan Conference Room **WRITTEN BY:** Moffatt & Nichol  
(D. Kokubun, C. Matson)

**PROJECT TITLE:** Tinian Harbor Master Planning Services (Project No. CPA-TS-001-15) and Rota West Harbor Master Planning Services (Project No. CPA-RS-001-15) **MN PROJECT:** 9538/9539

**SUBJECT:** CPA Out-Brief Meeting

**PARTICIPANTS:** Commonwealth Ports Authority (CPA): Wendi Prater  
Moffatt & Nichol (MN): Dean Kokubun, Christopher Matson  
SSFM CNMI (SSFM): Edwin Simbulan

**DISTRIBUTION:** Attendees

**REFERENCE DOCUMENTS:** None

#	ITEM	ACTION	DUE DATE
	<b>Port of Rota</b>		
	<ul style="list-style-type: none"> <li>CPA is beginning to enforce CNMI customs policy that all offloading of cargo shall be performed at the CPA commercial port and no cargo shall be offloaded at the Department of Lands and Natural Resources (DLNR) small boat marina at West Harbor Rota.</li> </ul> <p>Concerns with unmonitored and uncontrolled offloading of cargo include the importation of illegal and contraband goods (e.g., illegal drugs), invasive species (e.g., brown tree snake), and the potential risk of losing U.S. federal funding used to develop, operate and manage the small boat marina facilities.</p> <p>In addition, CPA does not collect wharfage and other fees when cargo is offloaded at the DLNR small boat marina.</p>		
1	<p>This was a primary issue of concern during the meeting with Mayor Atalig and during the public information meeting on Rota.</p> <p>MN will be looking at ways to accommodate the safe offloading of small vessels at the commercial port.</p> <ul style="list-style-type: none"> <li>CPA is in favor of a new breakwater for the harbor but is concerned about the cost, time to permit and construct, and the environmental challenges with building a new breakwater. Given those concerns, consideration should be given to planning as small a breakwater as possible – i.e., U.S. Army Corps of Engineers’ Public Scoping Meeting Project Alternative 1 Offshore Breakwater – that will still mitigate the wave energy in the harbor and channel but carry the least cost and impose the least environmental impact as possible.</li> </ul>		
	<b>Port of Tinian</b>		
2	<ul style="list-style-type: none"> <li>The Coast Guard mandates that all potentially hazardous cargo shall be offloaded at the commercial port and shall not be offloaded at the small boat</li> </ul>		



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marina just north of the commercial port. Currently, non-hazardous cargo is allowed to be imported through the small boat marina but it is not regulated nor inspected and no wharfage, dockage or stevedoring fees are collected on the imported cargo. MN asked if this policy will be continued into the future; CPA will get back to MN.

CPA

- Harbor users reported that the wharf lighting is currently inoperable. Harbor users requested that the inoperable lights be investigated and addressed as a high priority operational need. It was stated that it is suspected that the wiring had been removed from the existing lights.
- Since the U.S. military holds “lease back” on approx. two-thirds of the island of Tinian, the U.S. military’s authority as it relates to the harbor operations and future master plan for the Tinian Harbor is unclear (i.e., does the U.S. military have the authority to review, change, direct the master plan; does the U.S. military have the authority to control the day-to-day operations of the port and direct how berths and wharf / yard space is assigned; etc.). CPA will get back to MN with clarification.
- MN requested air passenger arrival logs for the past few years, including the time when the Tinian Dynasty Hotel & Casino was operating and after it closed. MN would like to try to correlate and approximate cargo volumes to the island due to the hotel.

CPA

CPA

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3 The U.S. Transportation Security Administration (TSA) and U.S. Customs and Border Protection (CBP) do not currently maintain a presence in either Tinian Harbor or Rota West Harbor.

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~ End Notes of Meeting ~



**DATE OF MEETING:** Wednesday, 15 March 2017

**TIME:** 9:00 p.m. ChST

**LOCATION:** Teleconference

**WRITTEN BY:** Moffatt & Nichol  
(D. Kokubun, C. Matson)

**PROJECT TITLE:** Tinian Harbor Master Planning Services (Project No. CPA-TS-001-15)

**MN PROJECT:** 9538

**SUBJECT:** Tinian Harbor Master Plan Concept Plans

<b>PARTICIPANTS:</b>	Commonwealth Ports Authority (CPA): Gerry Chrisostomo, JoyAnn Deleon Guerrero, Wendi Prater, Christopher Tenorio Moffatt & Nichol (MN): Dean Kokubun, Christopher Matson, Dan Solomon SSFM CNMI: Jessie Arizala, Denn Manglona, Edwin Simbulan
<b>DISTRIBUTION:</b>	Attendees
<b>REFERENCE DOCUMENTS:</b>	Tinian Harbor Concept Plans – Land Use Concept and Submerged Lands Master Plan with Phasing Plans; Agenda

#	ITEM	ACTION	DUE DATE
	<b>Meeting Purpose: To discuss the Tinian Harbor land use and submerged lands concept plans and seek comments, suggestions, and approval to proceed to final plans.</b>		
1	CPA: The commercial fleet, military fleet and passenger fleet lists provided in the attached agenda are accurate.		
2	CPA: Can the locations of the TANKER and the CARGO SHIP on the Phase 1a Berthing plan be reversed? MN: The layout, as currently shown was intended only to show that the vessels could be moored at the same time but, yes, the plan can be revised to show the two vessels reversed in location.	MN	
3	CPA: <i>Thunder &amp; Lightning</i> has used Berth 3 to roll on/roll off (RO/RO) cargo in med-moor using its bow ramp. Can this still be accommodated in the Phase layouts? MN: It is believed that a med-moor RO/RO operation can be accommodated but could CPA please provide photos of the med-moor operation so MN can review? CPA: Yes, G. Chrisostomo will find and provide photos to MN.	CPA	
4	CPA: Can a new ramp be shown located in the reentrant corner of Berth 1 and the connecting pier. MN: Yes, a ramp will be added to the plan.	MN	
5	CPA: Will the proposed removal of the middle finger pier during Phase 1b expose Berth 1 to more wave activity? MN: Based on MN's review of the available coastal and wave data, the removal of the middle finger pier should not result in increased wave activity at Berth 1.		
6	CPA: Phase 2 (final phase of Master Plan) is acceptable to CPA.		
7	CPA: U.S. Air Force recently provided CPA with a notional "Fuel/Fire Pump House & Pipeline" plan which locates a proposed new pump house and fire protection facility directly behind Berth 1 / 2 and adjacent to the existing Mobil fuel tanks and proposed stevedores relocation site. The fuel lines from the pump house to the airport storage tanks would be set below grade.		

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MN: The proposed fuel/fire pump house is located on land directly adjacent to the port that MN recommends be reserved for a future cargo area expansion due to its proximity to the port and cargo offload / on-load operations, as shown on the Tinian Harbor Land Use Concept plan. Also, CPA should be aware that if the fuel pipes will be set below grade, the pipes should be inspected periodically either by pig or visually, either by unearthing them or, if installed in trenches with covers, by pulling the covers and physically inspecting them.

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8 CPA confirmed that the old passenger building at Berth 1 will be demolished.

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9 MN: What functions are supported by the CPA Administration Complex?  
CPA: It contains the seaport staff offices and a conference room. Boats will also be stored in the complex.  
MN: Could a description for the program supported by this complex be sent to MN?  
CPA: Yes, CPA will send MN a description of the complex. CPA

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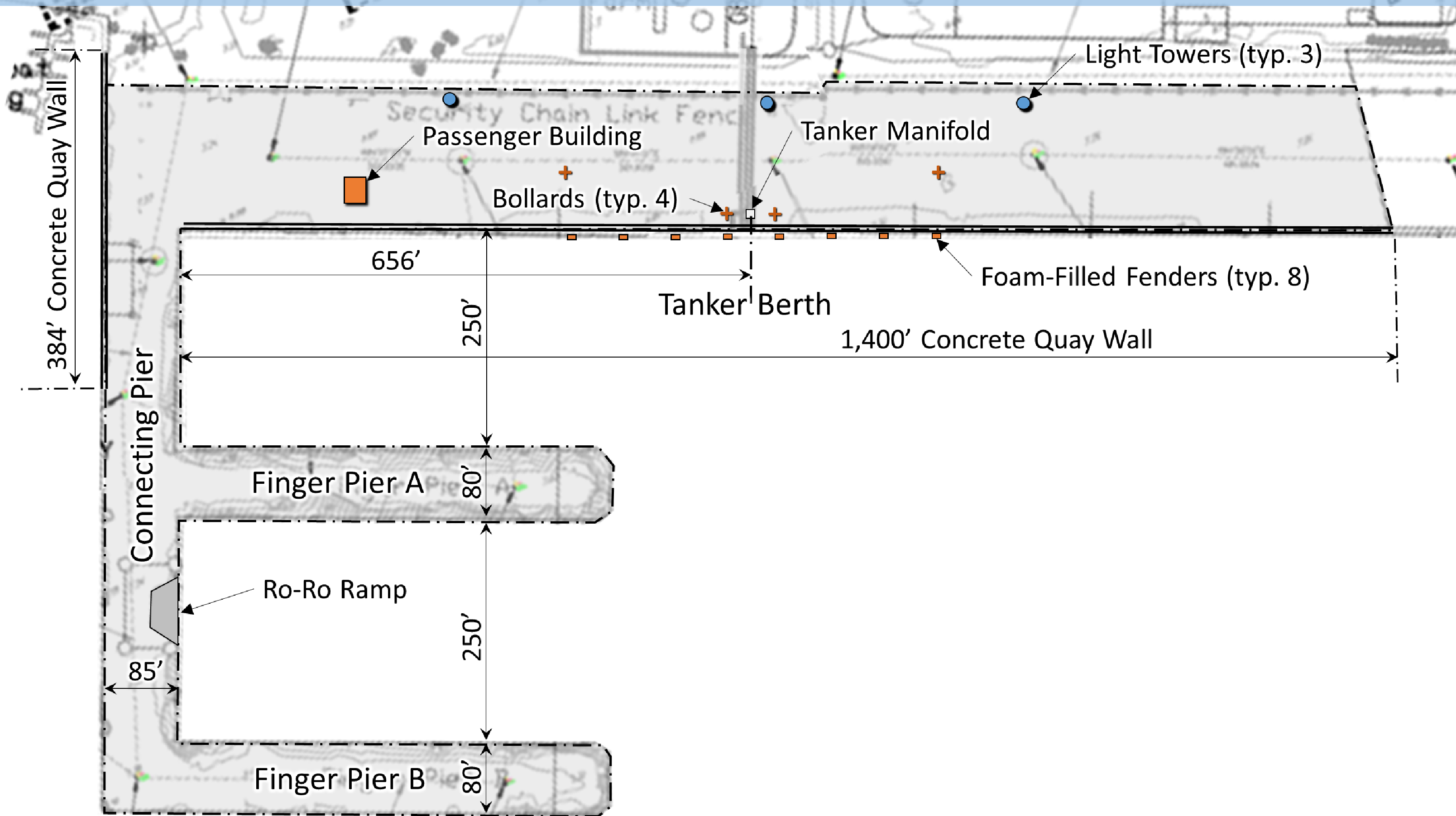
10 MN: It was observed that a couple of deteriorating vessels are currently being stored on blocks at the SNN site adjacent to the small boat ramps west of the commercial harbor. The lease for the SNN land is set to expire in ~2020. Have operations at the site stopped completely and if so, is the lease at risk of being terminated prior to its expiration?  
CPA: The operations related to the site stopped for a while but have recently begun.

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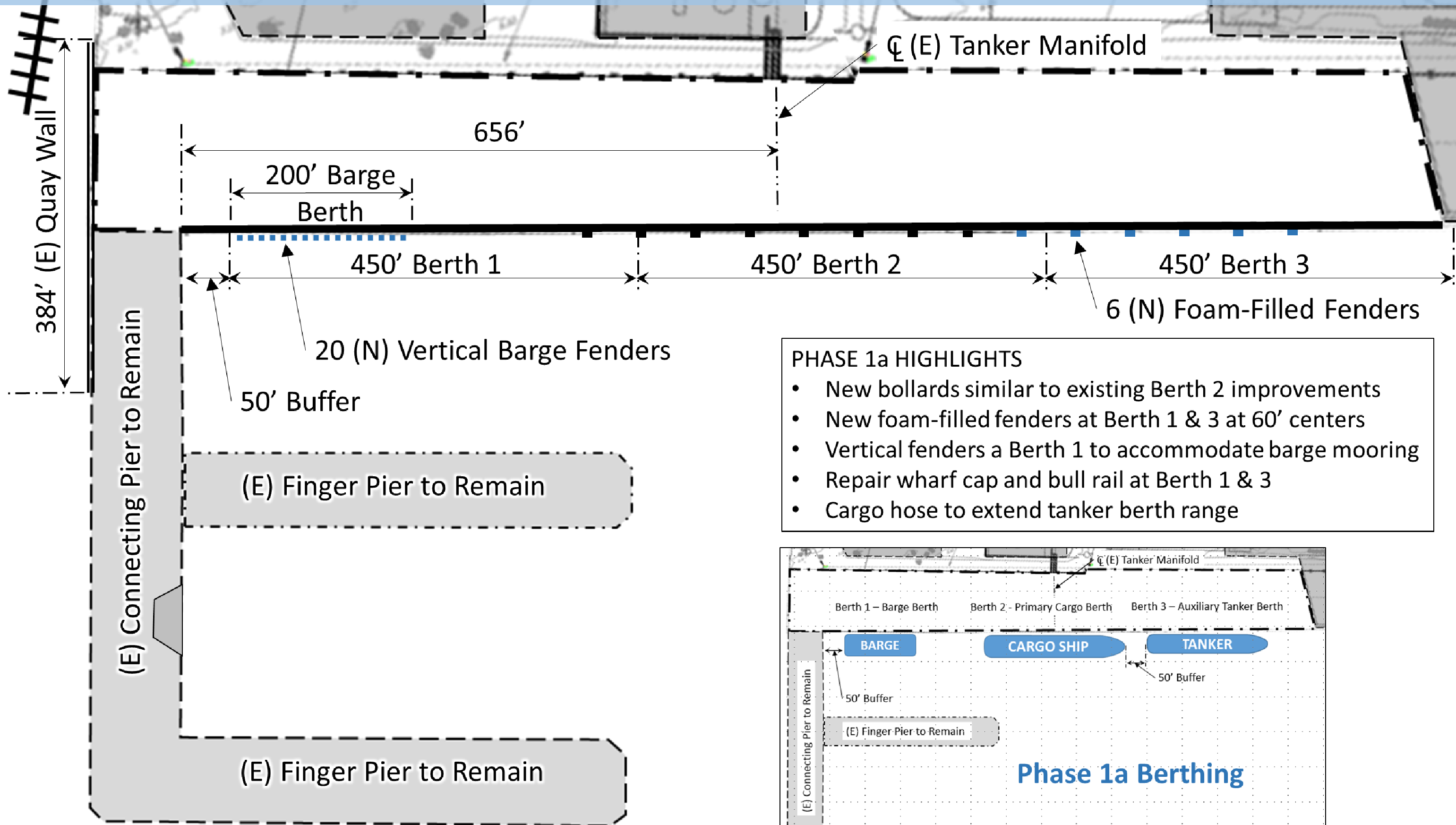
~ End Notes of Meeting ~



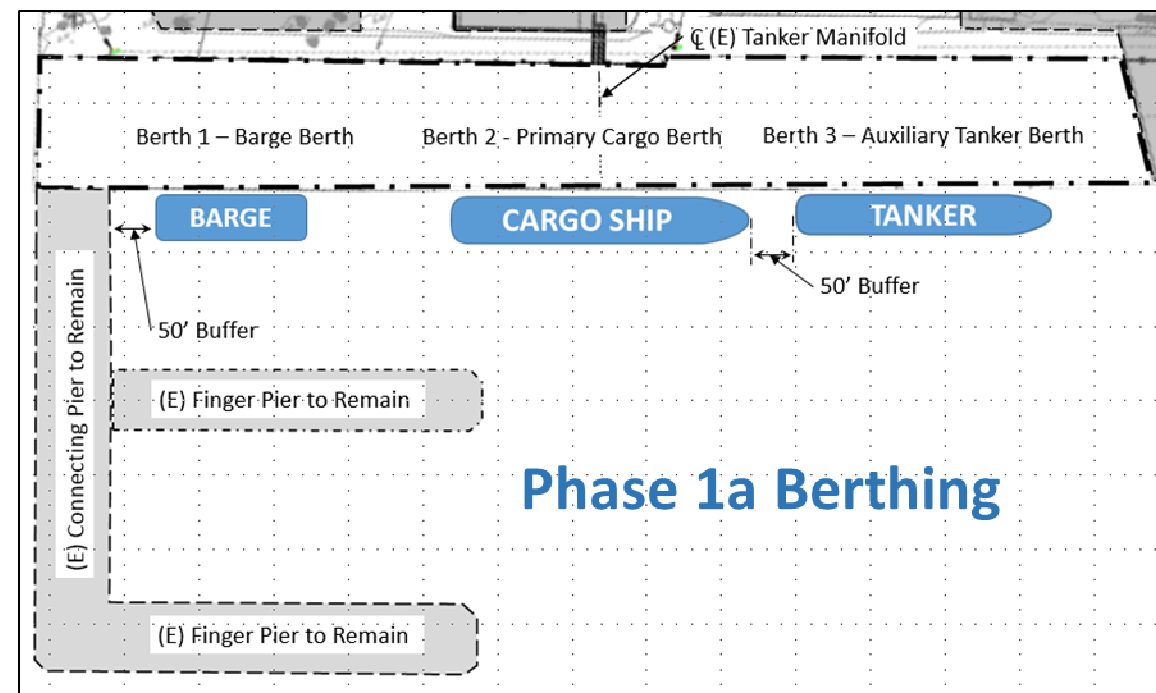
# TINIAN HARBOR EXISTING FEATURES



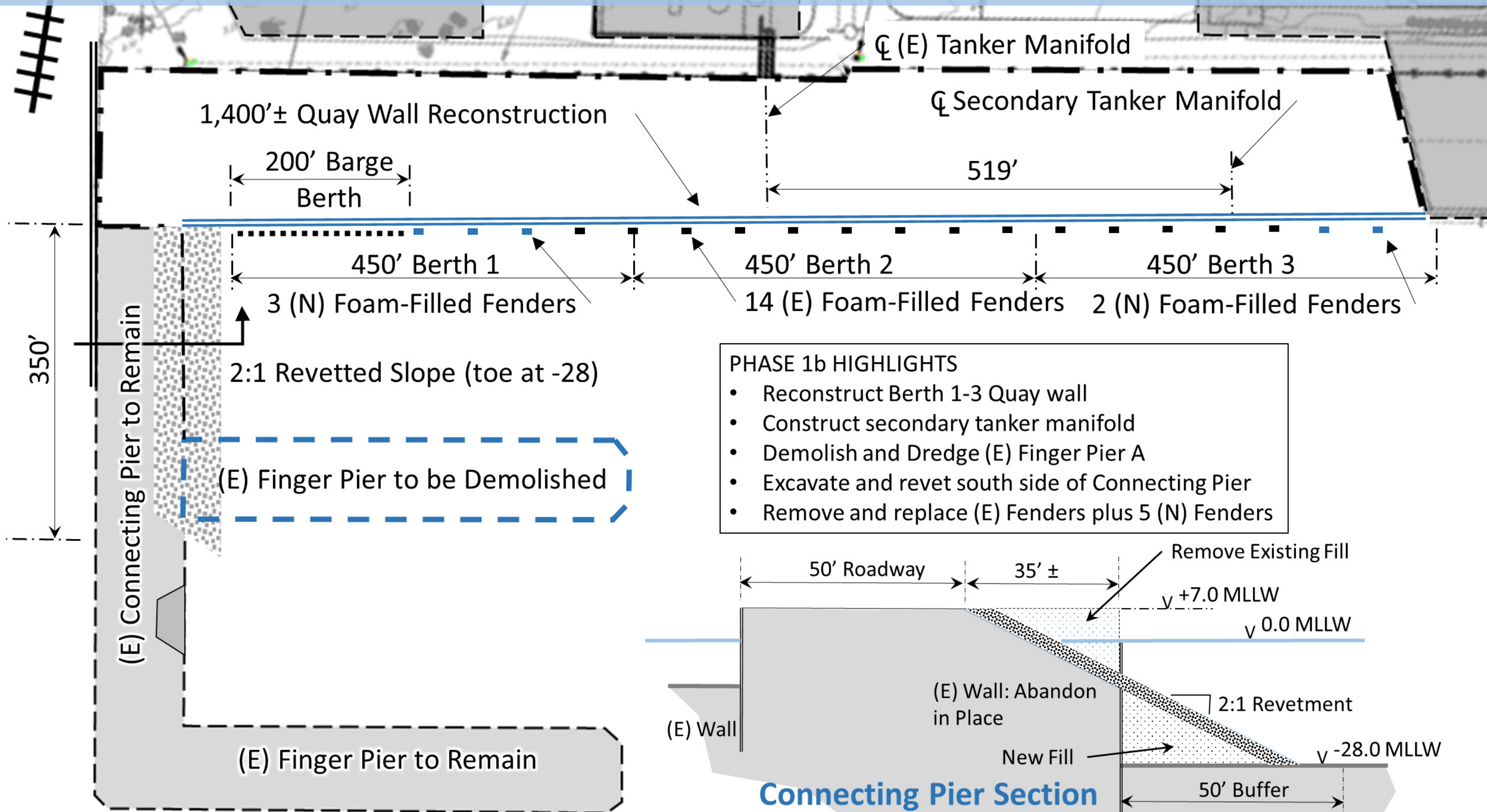
# TINIAN HARBOR MASTER PLAN PHASE 1a



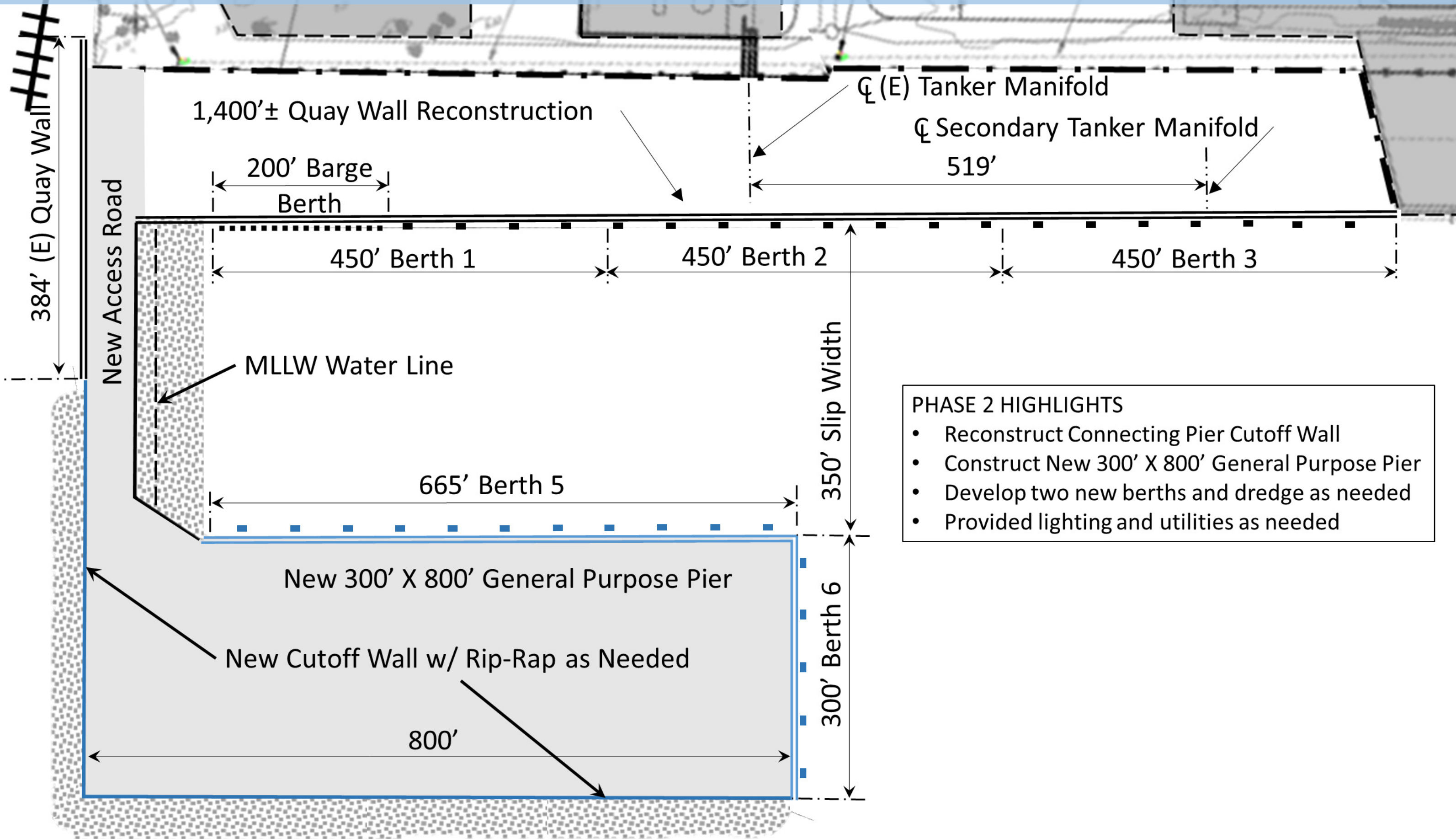
- PHASE 1a HIGHLIGHTS**
- New bollards similar to existing Berth 2 improvements
  - New foam-filled fenders at Berth 1 & 3 at 60' centers
  - Vertical fenders at Berth 1 to accommodate barge mooring
  - Repair wharf cap and bull rail at Berth 1 & 3
  - Cargo hose to extend tanker berth range



# TINIAN HARBOR MASTER PLAN PHASE 1b

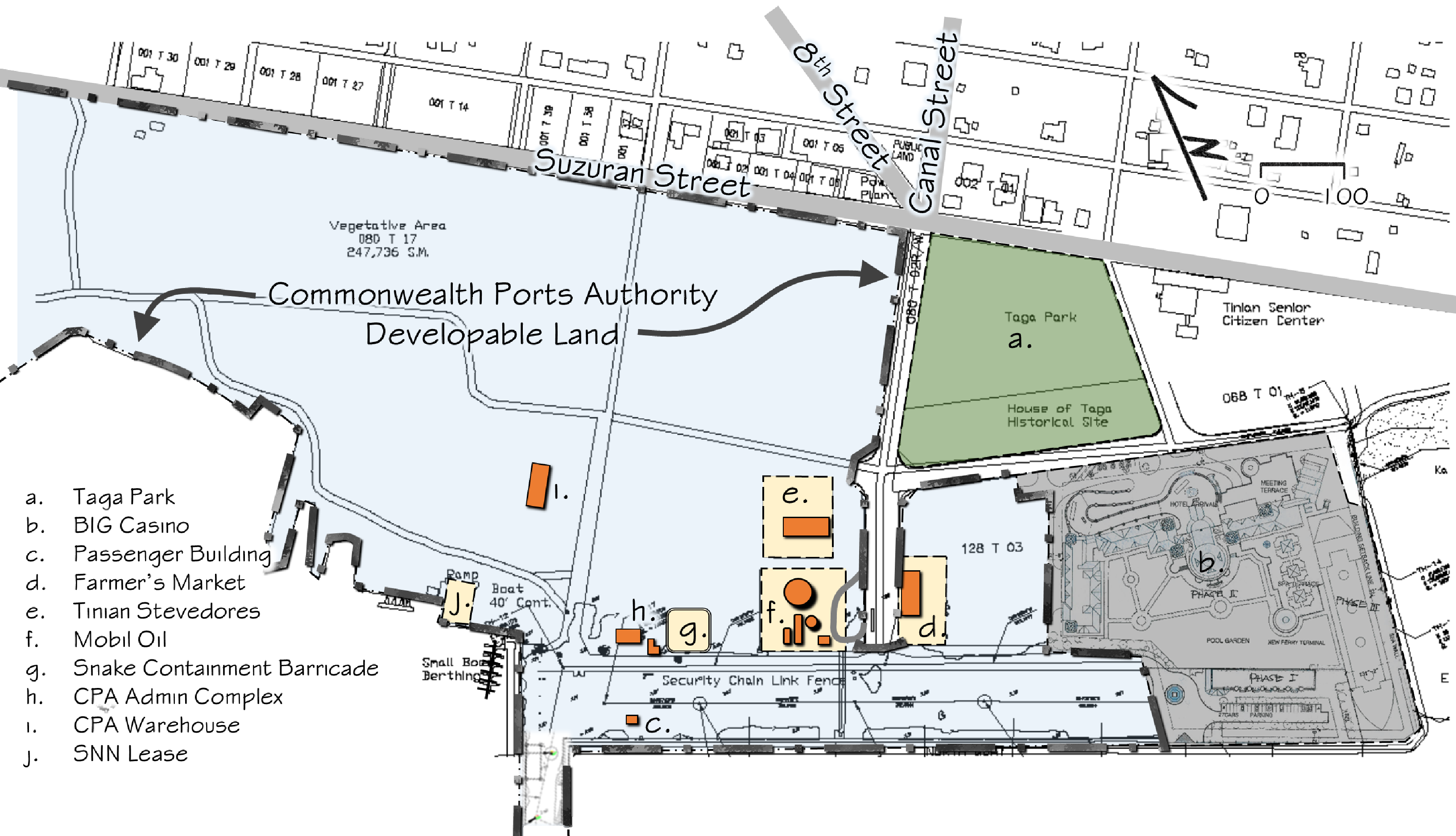


# TINIAN HARBOR MASTER PLAN PHASE 2



- PHASE 2 HIGHLIGHTS**
- Reconstruct Connecting Pier Cutoff Wall
  - Construct New 300' X 800' General Purpose Pier
  - Develop two new berths and dredge as needed
  - Provided lighting and utilities as needed

# TINIAN HARBOR UPLAND EXISTING FEATURES



- a. Taga Park
- b. BIG Casino
- c. Passenger Building
- d. Farmer's Market
- e. Tinian Stevedores
- f. Mobil Oil
- g. Snake Containment Barricade
- h. CPA Admin Complex
- i. CPA Warehouse
- j. SNN Lease



# TINIAN HARBOR LAND USE CONCEPT



# AGENDA

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**Subject: Tinian Harbor Master Plan, Project No. CPA-TS-001-15**  
**Coordination Meeting, Wednesday, 15 March 2017, 9:00 a.m. ChST**

**M&N Job No.: 9538**

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1. Progress report
  - A. Bathymetry
  - B. Site drawings
  - C. Financial analysis
2. Commercial Fleet Assumptions
  - A. Tanker: Akri class, 350' - 400' l. x 25' d.
  - B. Freighter: Geared container, 400'-450' l. x 25' d.
  - C. Inter-island barge: 200' l. x 15' d.
  - D. Landing craft: 125' l. x 10' d. (estimated)
3. Military Fleet Assumptions
  - A. Supply: ITB Thunder/ Lightning, 460 l. x 20 d. (barge only)
  - B. Expeditionary: JHSV, 550 l. x 22 d.
  - C. Other: commercial fleet
4. Passenger Fleet
  - A. Bridge Investment Group ferry: 206' l. x 7.0' d.
  - B. ACG ferry: 127' l. x 4.3' d.
  - C. Cruise: 350' - 550' l. x 15' - 20' d.
5. Upland Development
  - A. Key drivers
  - B. Traffic circulation
  - C. Boundaries and fences
  - D. U.S. Air Force / DoD fuel transfer
  - E. Small craft harbor and public access
6. Harbor Development
  - A. Auxiliary tanker berth
  - B. Dedicated barge berth
  - C. Quay wall reconstruction
  - D. Ferry and RO-RO (landing craft) berth
  - E. Facilities repair / upgrade
  - F. Phase 2 (with military)
  - G. Initial budget estimates
7. Next Steps
  - A. Refined near-dock and upland plans
  - B. Schedule and phasing
  - C. Report outline

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**DATE OF MEETING:** Tuesday, March 13, 2018 **TIME:** 1:30 p.m. CHST

**LOCATION:** Saipan Seaport Conference Room **WRITTEN BY:** Moffatt & Nichol  
(D. Kokubun, C. Matson)

**PROJECT TITLE:** Tinian Harbor Master Planning Services  
(Project No. CPA-TS-001-15)  
Rota West Harbor Master Planning Services  
(Project No. CPA-RS-001-15) **MN PROJECT:** 9538 & 9539

**SUBJECT:** CPA In-Brief Meeting

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**PARTICIPANTS:** See attached *In-Brief Meeting - Sign-In Sheet*

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**REFERENCE DOCUMENTS:**

- Tinian Harbor Master Plan (CPA-TS-001-15) Meeting Presentation, dated March 13, 2018 (6 sheets)
- Rota West Harbor Master Plan (CPA-RS-001-15) Meeting Presentation, dated March 13, 2018 (5 sheets)

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## ITEM

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### ***Presentation (by Moffatt & Nichol)***

Christopher Matson of Moffatt & Nichol (MN) presented the Tinian Harbor Master Plan and the Rota West Harbor Master Plan presentations. The presentations are attached herewith.

- Tinian and Rota government and CPA representatives and other dignitaries lists were updated in each presentation
- 

### ***Summary of discussion on the Tinian Harbor Public Meeting presentation***

- a. *Akri* (fuel ship) is still operating service to Tinian
  - b. *Pacific Seas* requires 29 feet of draft clearance
  - c. Bridge Investment Group (BIG) is still investigating options for Saipan-Tinian ferry service; site for Saipan ferry terminal has not been identified yet
  - d. Pacific Marine (*Jayden* operator) just renewed its lease with CPA for another 5-years
  - e. Pacific Marine currently moors at the West Quay
  - f. MN shall confirm and identify dimensions on full plan master plan layout figure (i.e., RO-RO ramp, access road)
  - g. MN shall modify upland maps to show road on Commonwealth Ports Authority Land to run straight to the intersecting (proposed “public and military access”) road
  - h. Department of Defense fuel facility will be located upland of the Commonwealth Ports Authority Land road; temporary construction staging area will be on the water-side of the road
- 

### ***Summary of discussion on the Rota West Harbor Public Meeting presentation***

- a. CPA reported that bollards have been replaced at Berth 1, but not sure if bollards at Berth 2 have been replaced (Post-meeting note: the bollards at Berth 2 have been replaced)
  - b. CPA will be replacing tractor tires but not sure if at Berth 1 or Berth 2 (Post-meeting note: CPA later confirmed new fenders will be installed at both Berth 1 and Berth 2)
- 

***Any additional comments on the Master Plans should be sent to Wendi Prater within one week.***

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~ End Notes of Meeting ~

TINIAN HARBOR MASTER PLAN (PROJECT NO. CPA-TS-001-15) and ROTA WEST HARBOR MASTER PLAN (PROJECT NO. CPA-RS-001-15)

In-Brief Meeting with Commonwealth Ports Authority - Sign-In Sheet



Saipan Seaport Conference Room, 13 March 2018, 1:30 p.m.

#	NAME	AGENCY / COMPANY (as applicable)	TELEPHONE (optional)	E-MAIL (optional)
1	JOY ANN DIEUERREKO	CPA		joyalg@cpa.gov.mp
2	Skyc Aldan	CPA		skye.aldan@cpa.gov.mp
3	DENN MANGONA	PEGS		dmangona@pegsmp.com
4	ROY REYES	PEGS		rreyes@pegsmp.com
5	Nathan Johnson	MES		natejohnson72@yahoo.com
6	Jerra Cing	CPA		jerra.cing@cpa.gov.mp
7	Anthony Camacho	CPA		anthony.camacho@cpa.gov.mp
8	Wendi Prater	CPA	237619	wprater@cpa.gov.mp
9	DEAN KOKUBUN	MOFFATT ; NICHOL	8085337000	DKokubun@MoffattNichol.com
10	CHRISTOPHER MATSON	MOFFATT ; NICHOL	7576288222	CMatson@MoffattNichol.com
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# Tinian Harbor Master Plan (CPA-TS-001-15)

Commonwealth Ports Authority (CPA)  
Commonwealth of the Northern Mariana Islands  
CPA In-Brief Meeting

March 13, 2018

## Tinian Harbor Public Meeting - Welcome & Introductions

- CNMI government and CPA representatives and other distinguished guests
  - The Honorable Ralph DLG Torres, Governor
  - The Honorable Victor B. Hocog, Lt. Governor
  - The Honorable Joey P. San Nicolas, Mayor
  - Tinian Legislative Delegation
  - Tinian Municipal Council
  - Kimberlyn King-Hinds, CPA Board of Directors, Tinian Representative
  - Edward B. Mendiola, CPA Deputy Director
  - Antonio L. Borja, Tinian Ports Manager
- Moffatt & Nichol – port planning and engineering consultant to CPA
- Pacific Engineering Group & Services – civil engineering and local coordination



Tinian Harbor Master Plan



## Meeting Agenda

- Welcome and introductions
- Public & Stakeholder Comments
- Scope of Master Plan
- Condition report
- Findings
- Master Plan recommendations
- Construction cost and phasing plan
- Discussion



*Photo By: Micronesia Environmental Services*




Tinian Harbor Master Plan




## Tinian Harbor Master Plan Scope

- Define the issues
- Document the physical conditions
- Forecast the need
- Develop solutions
- Devise an implementation plan
- Consider the costs
- Present the plan




Tinian Harbor Master Plan




## Tinian Harbor Master Plan Public & Stakeholder Comments

- Deterioration of existing breakwater
- Deterioration/Restrictions imposed by existing piers & wharves
- Lack of berth space:
  - Cargo
  - Fuel
  - Military use of harbor
  - Future cruise and ferry service
- Public access & use of harbor (i.e., small boat berths & ramp, fish cleaning and weighing stations, picnic & BBQ area, boat wash down area, etc.)



Tinian Harbor Master Plan

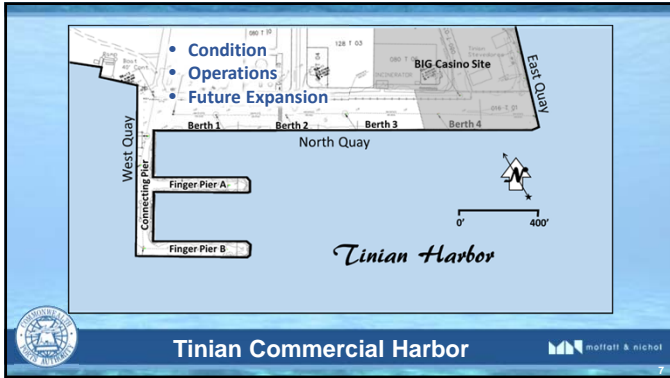



The map shows the Tinian Harbor area with labels for 'Tinian Power Station', 'Former Breakwater Alignment', 'Small Boat Harbor', 'Tinian Seaport', 'Commonwealth Ports Authority Land', 'SAN JOSE MUNICIPALITY', 'House of Taga', 'Tinian Harbor', and 'Philippine Sea'. A scale bar indicates 0 to 400 feet.



Tinian Harbor General Site Plan

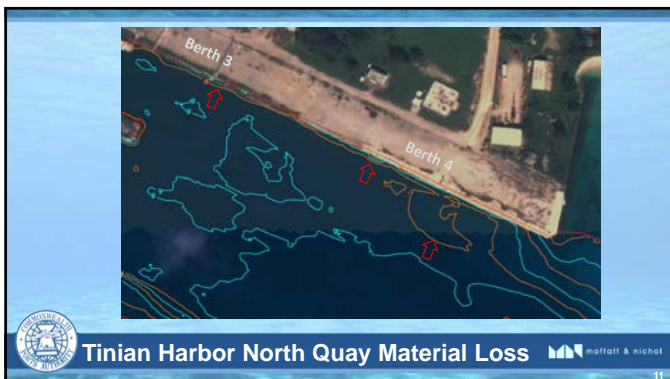
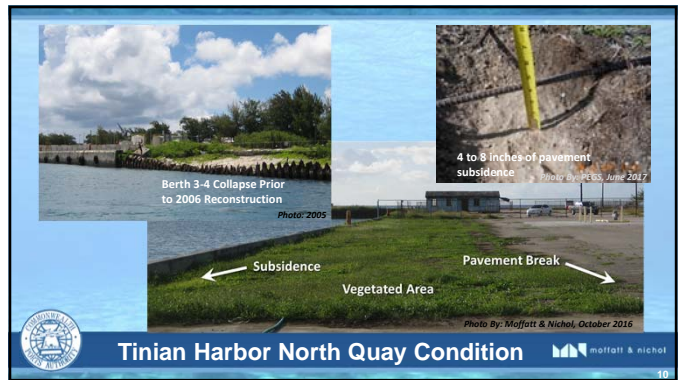




- **Berth 1:** Quay wall corrosion, loss of backfill, missing fenders
- **Berth 2:** Quay wall corrosion, loss of backfill
- **Berth 3:** Quay wall corrosion, loss of backfill, missing fenders

Photos By: Moffatt & Nichol, October 2016

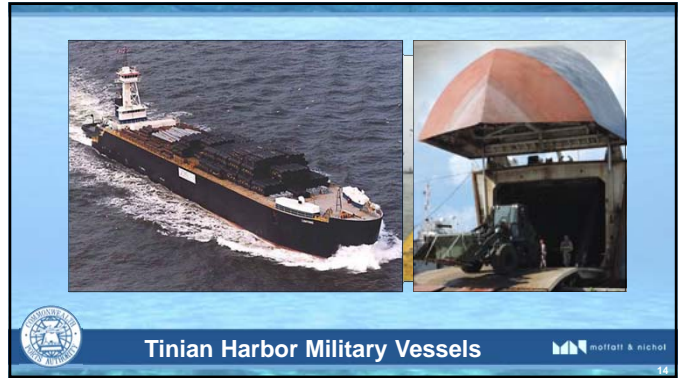
**Tinian Harbor North Quay Condition**





Tinian Harbor Commercial Vessels

moffatt & nichol



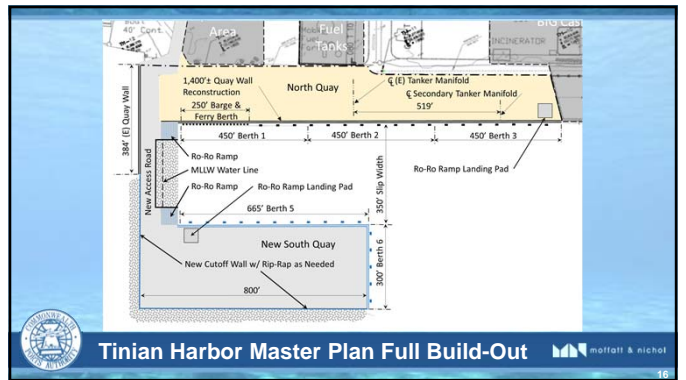
Tinian Harbor Military Vessels

moffatt & nichol



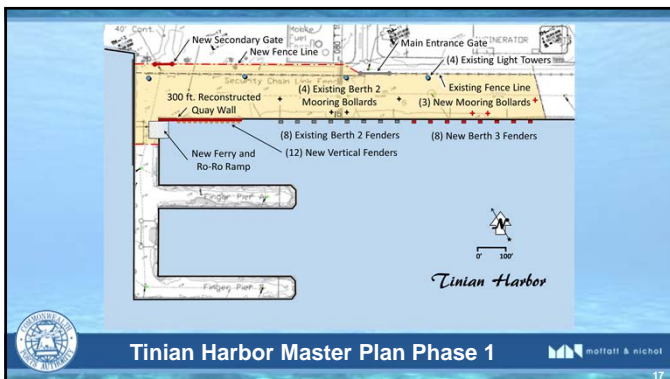
Tinian Commercial Harbor

moffatt & nichol



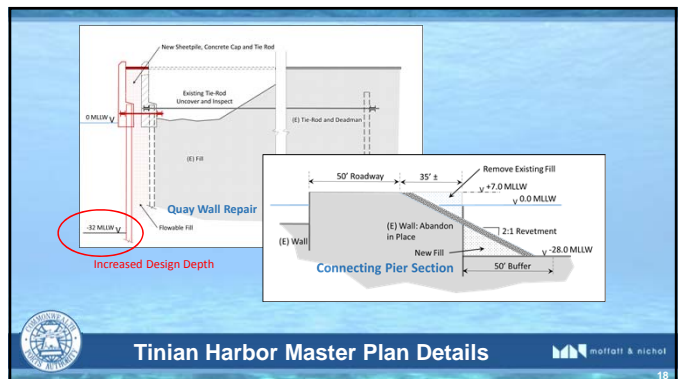
Tinian Harbor Master Plan Full Build-Out

moffatt & nichol



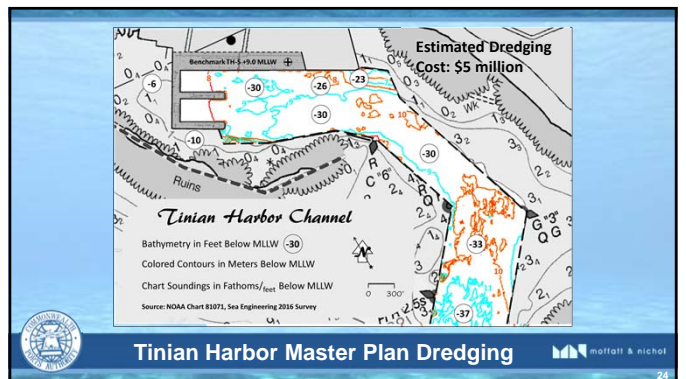
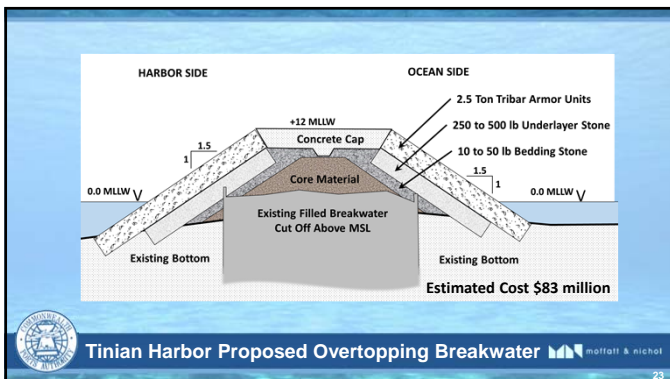
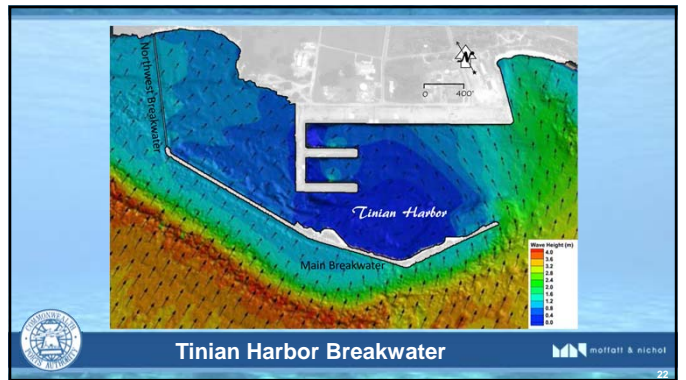
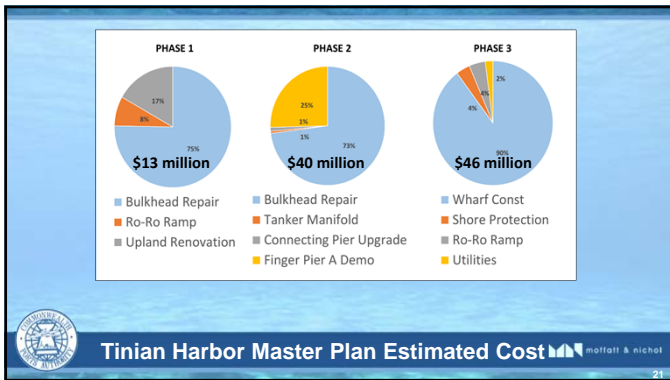
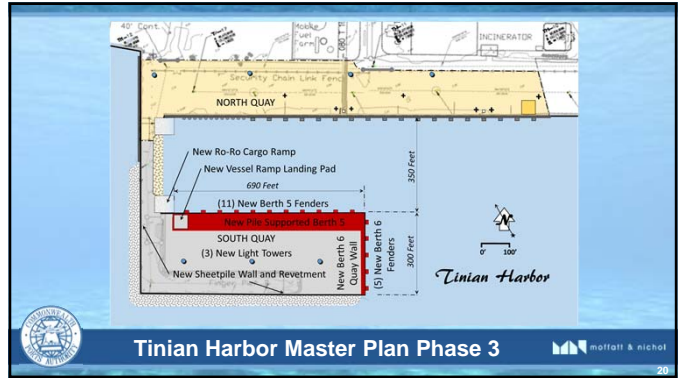
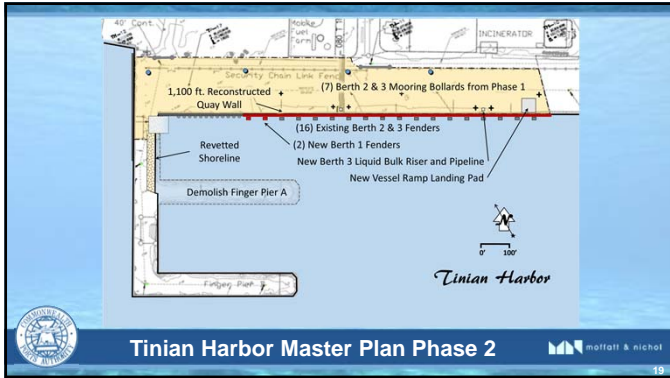
Tinian Harbor Master Plan Phase 1

moffatt & nichol

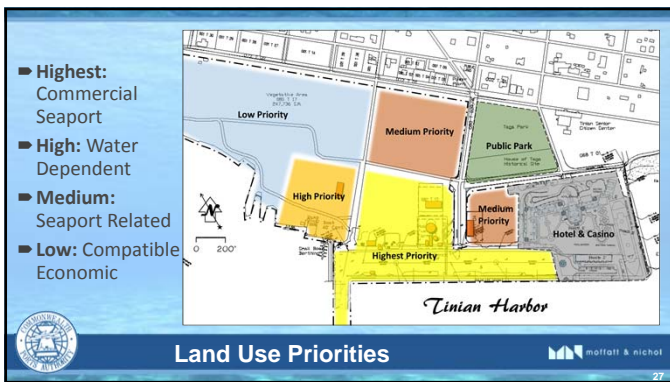
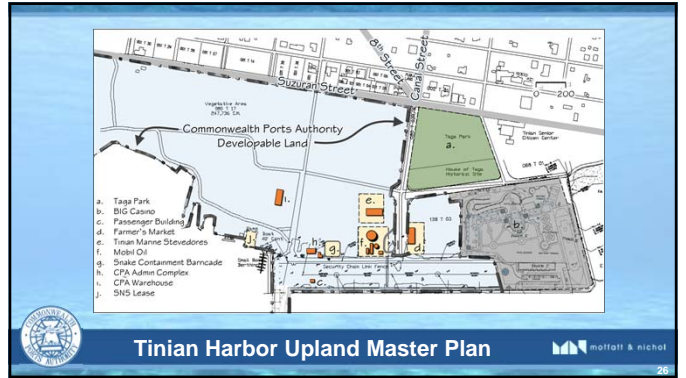


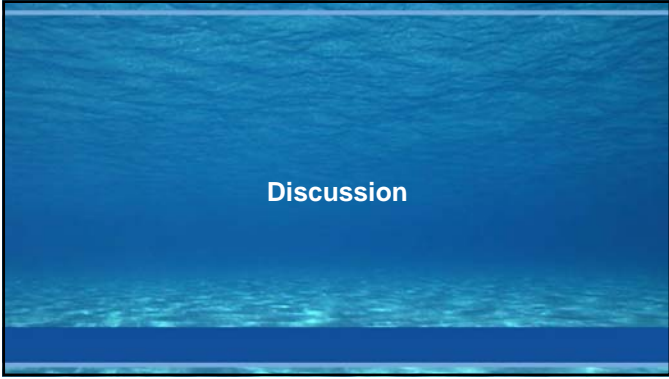
Tinian Harbor Master Plan Details

moffatt & nichol











## Rota West Harbor Master Plan (CPA-RS-001-15)

**Commonwealth Ports Authority (CPA)  
Commonwealth of the Northern Mariana Islands  
CPA In-Brief Meeting**

March 13, 2018

### Rota West Harbor Public Meeting - Welcome & Introductions

- CNMI government and CPA representatives and other distinguished guests
  - The Honorable Ralph DLG Torres, Governor
  - The Honorable Victor B. Hocog, Lt. Governor
  - The Honorable Efraim Atalig, Mayor
  - Rota Legislative Delegation
  - Rota Municipal Council
  - Barrie Toves, CPA Board of Directors, Rota Representative
  - Edward B. Mendiola, CPA Deputy Director
  - Sharlene Manglona, Rota Ports Manager
- Moffatt & Nichol – port planning and engineering consultant to CPA
- Pacific Engineering Group & Services – civil engineering and local coordination



**Rota West Harbor Master Plan**



### Meeting Agenda

- Welcome and introductions
- Public & Stakeholder Comments
- Scope of Master Plan
- Condition report
- Findings
- Master Plan recommendations
- Construction cost and phasing plan
- Discussion



Photo by: Micronesian Environmental Services



**Rota West Harbor Master Plan**



### Rota West Harbor Master Plan Public & Stakeholder Comments

- Reliable & safe cargo delivery
- Channel & breakwater improvements
- Limitations of existing crane
- Unregulated/Uncontrolled offloading of cargo at small boat marina
- Facilitating safe offloading of cargo from light vessels
- Maintaining public access to harbor




**Rota West Harbor Master Plan**




### Rota West Harbor Master Plan Scope

- Define the issues
- Document the physical conditions
- Forecast the need
- Develop solutions
- Devise an implementation plan
- Consider the costs
- Present the plan



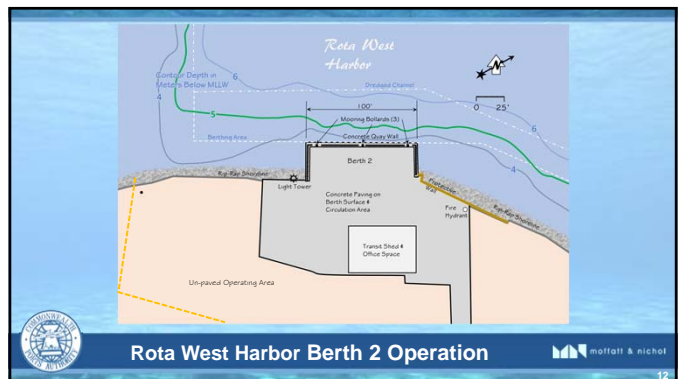
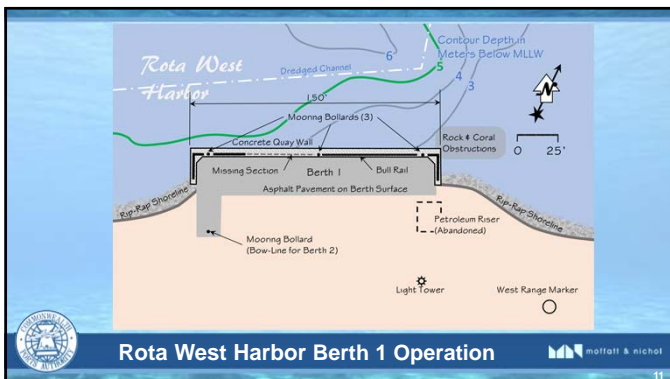
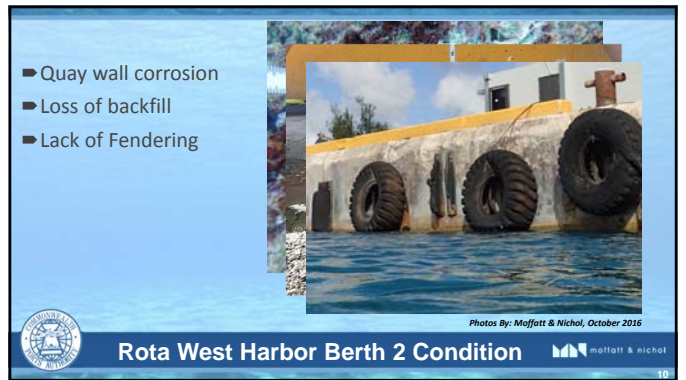
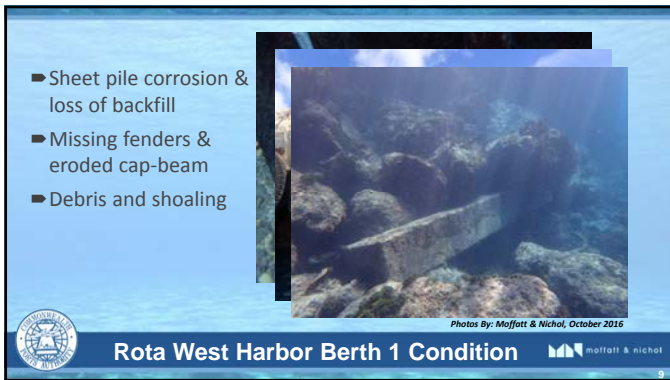
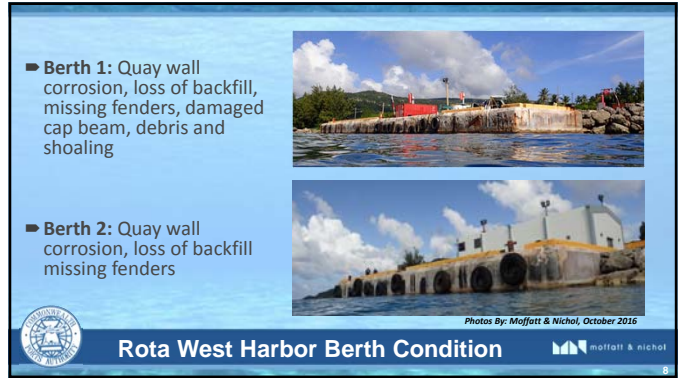
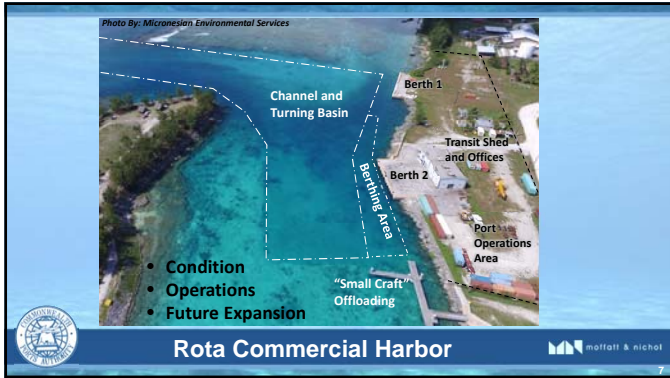
**Rota West Harbor Master Plan**

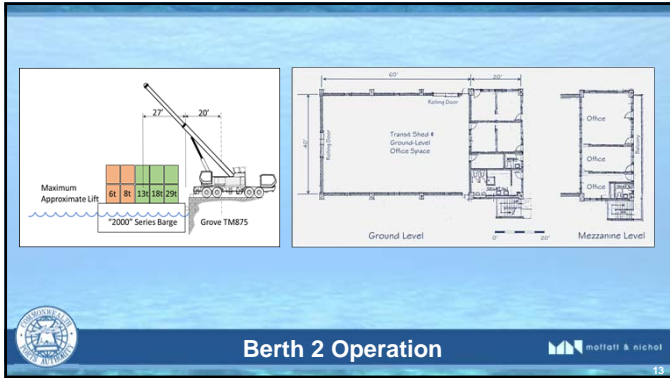




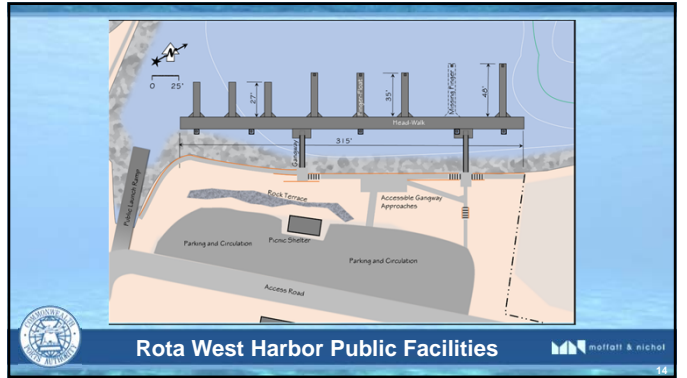
**Rota West Harbor General Site Plan**



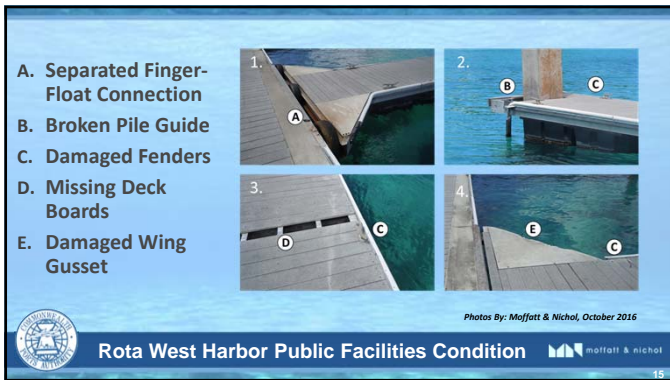




Berth 2 Operation



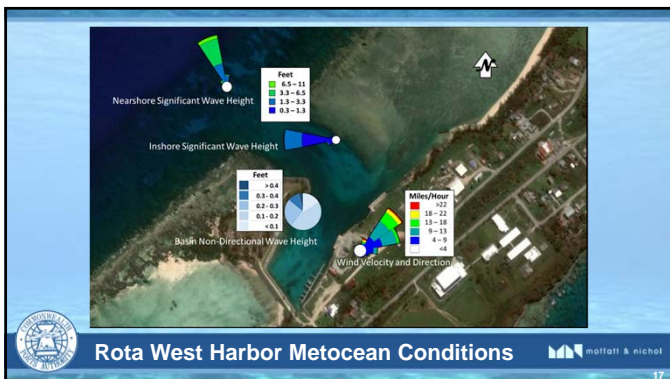
Rota West Harbor Public Facilities



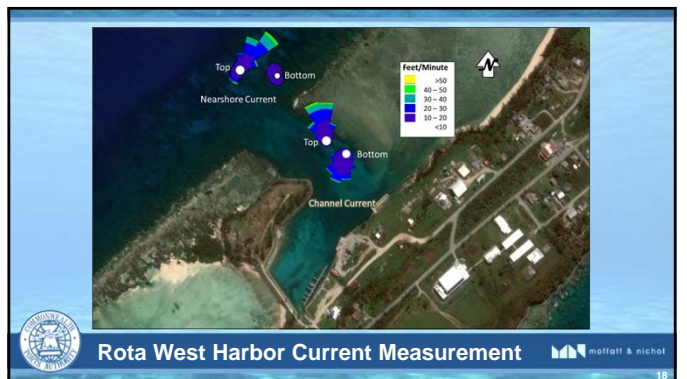
Rota West Harbor Public Facilities Condition



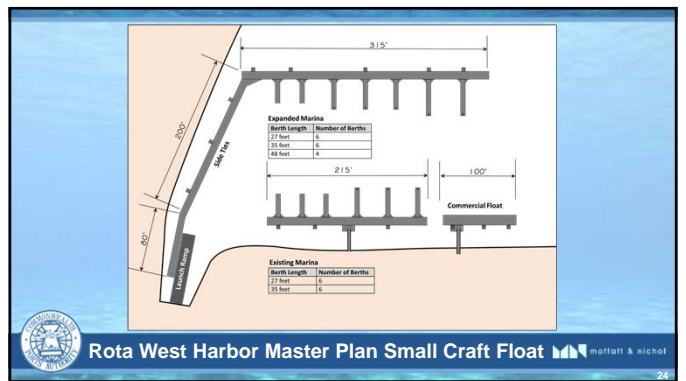
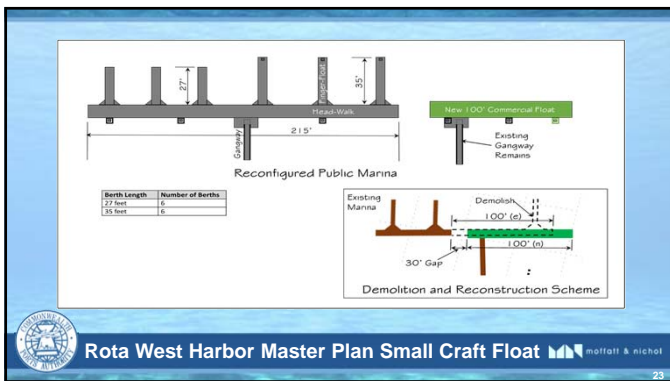
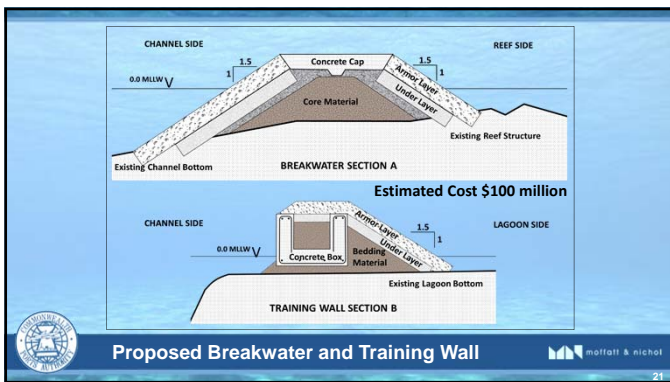
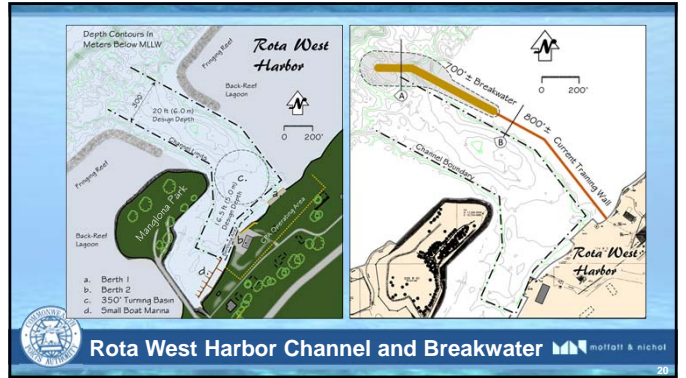
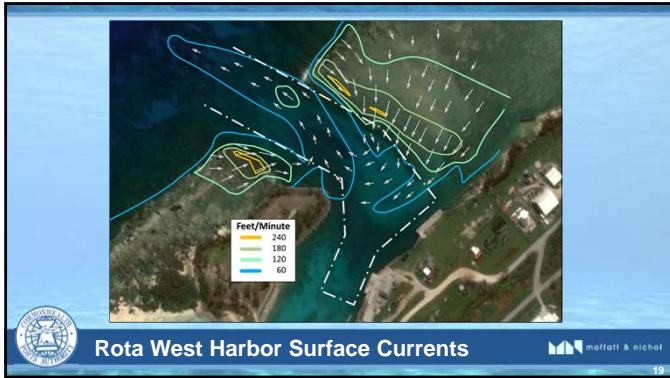
Rota West Harbor Design Vessels

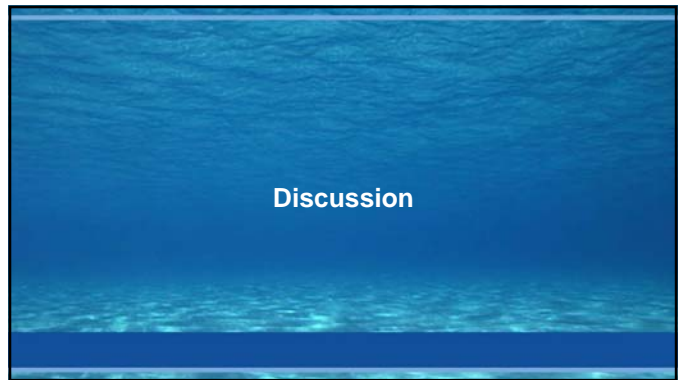
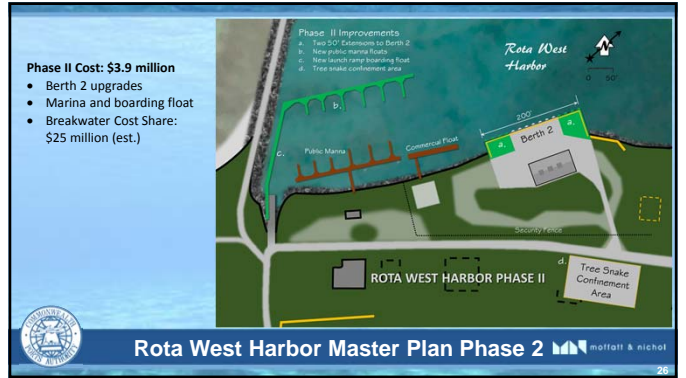


Rota West Harbor Metocean Conditions



Rota West Harbor Current Measurement





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**DATE OF MEETING:** Tuesday, March 13, 2018 **TIME:** 3:00 p.m. CHST

**LOCATION:** Saipan Seaport Conference Room **WRITTEN BY:** Moffatt & Nichol  
(D. Kokubun, C. Matson)

**PROJECT TITLE:** Tinian Harbor Master Planning Services  
(Project No. CPA-TS-001-15)  
Rota West Harbor Master Planning Services  
(Project No. CPA-RS-001-15) **MN PROJECT:** 9538 & 9539

**SUBJECT:** Tinian and Rota Seaport Operators Meeting

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**PARTICIPANTS:** See attached *Seaport Operators Meeting - Sign-In Sheet*

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**REFERENCE DOCUMENTS:**

- Tinian Harbor Master Plan (CPA-TS-001-15) Meeting Presentation, dated March 13, 2018 (6 sheets)
- Rota West Harbor Master Plan (CPA-RS-001-15) Meeting Presentation, dated March 13, 2018 (5 sheets)

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## ITEM

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### ***Presentation (by Moffatt & Nichol)***

Christopher Matson of Moffatt & Nichol (MN) presented the Tinian Harbor Master Plan and the Rota West Harbor Master Plan presentations. The presentations are attached herewith.

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### ***Summary of discussion on the Tinian Harbor Master Plan presentation***

- Question 1:*** *Who is responsible for the breakwater?*  
***Response 1:*** Breakwater repair/reconstruction is currently being reviewed by the U.S. Army Corps of Engineers (USACE).
  - Question 2:*** *Would breakwater repairs/improvements have to be done before any Commonwealth Ports Authority (CPA) improvements being proposed under the Master Plan can be undertaken?*  
***Response 2:*** No, not necessarily, master plan improvements may be done without the USACE improvements. Although the breakwater improvements would improve the conditions in the harbor in the long run, the improvements proposed under the CPA master plan themselves would improve the port facilities during for more active harbor conditions.
  - Question 3:*** *Does the master plan accommodate small vessels?*  
***Response 3:*** Yes, small vessels can be accommodated at the West Quay. Ferry service is accommodated at Berth 1.
  - Question 4:*** *Does the master plan costs include dredging and breakwater improvements?*  
***Response 4:*** No, the dredging and breakwater repair/improvements would be performed by the U.S. government so costs are estimated by, and would be funded by, the U.S. federal government (with CPA cost sharing).
  - Question 5:*** *Does the master plan include a new seawater fire suppression system?*  
***Response 5:*** Yes, the Recommended Land Use Plan does identify the seawater fire suppression system located upland of the small boat harbor expansion area, west of the west access road.
  - Question 6:*** *Could the area identified as the Small Boat Harbor Expansion area be used for RO/RO operations?*  
***Response 6:*** It was considered in preparing the Master Plan, however, the area is fairly shallow (6' to 8' depth) so dredging would be necessary for larger vessels to make this area viable for RO/RO operations. Furthermore, the USACE's study area and area of responsibility (i.e., federal project area) does not include this area so funding
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would not be available from the U.S. federal government to perform the dredging which would make the repurposing prohibitively expensive for CPA.

- g. Question 7: Port lighting is currently not operating. When will it be repaired? Has the master plan recommended additional new lighting?

Response 7: CPA is aware of the non-operational lights. CPA had requested funding from the Department of Homeland Security (DHS) but the funding has not been approved yet. The yard lighting will be repaired as soon as possible. The current spacing of the light poles at the port is fairly typical so lighting of the North Quay was presumed to be adequate once the lights are repaired (Post-meeting note: A lighting analysis was not in the scope of this master planning effort so the wharf lighting would have to be analyzed under a separate action to be sure). Three new light poles have been identified on the Berth 5 and 6 build out.

- h. Question 8: Has the Tinian delegation been provided the draft master plan? If government funding is needed, coordination should be performed with the Tinian delegation.

Response 8: The Tinian delegation has been invited to the public meeting to be held on Wednesday, 14 March 2018.

- i. Question 9: Will construction material be allowed to offload directly at the port in the future?

Response 9: Construction material is allowed to enter the port as long as the vessel has been cleared with U.S. Customs and Border Protection (CBP) at the Port of Saipan or CBP inspection in Tinian is coordinated beforehand since CBP does not have a full-time inspector stationed on Tinian and the CBP inspector would have to travel from Saipan to meet the vessel.

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**Summary of discussion on the Rota West Harbor Master Plan presentation**

- a. Question 1: Is there a chance the M/V Luta may return to Rota service?

Response 1: The M/V Luta is currently in drydock, under new ownership, so it is believed the intent is for the vessel to return to serve Rota (service is anticipated to be 17-20 containers per month).

- b. Question 2: Would the Luta be a Saipan-Rota only service?

Response 2: Not sure if Saipan-Rota or Saipan-Tinian-Rota service. Shippers are still reviewing.

- c. Question 3: Did the master plan include the Rota East Harbor?

Response 3: Although the Rota East Harbor master plan was prepared under a separate contract in 2015, it was considered in preparing the Rota West Harbor Master Plan.

- d. Question 4: Could a RO-RO operation be possible on Rota?

Response 4: A RO-RO operation at Rota East Harbor may be possible, however, it is currently not legal so additional coordination and permission would have to be obtained before service is even considered.

- e. Question 5: Was widening of the channel considered?

Response 5: The CPA Master Plan and the USACE's feasibility study/Environmental Impact Statement (EIS) do not consider widening of the channel.

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**Any additional comments on the Master Plans should be sent to CPA within one week.**

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~ End Notes of Meeting ~



TINIAN HARBOR MASTER PLAN (PROJECT NO. CPA-TS-001-15) and ROTA WEST HARBOR MASTER PLAN (PROJECT NO. CPA-RS-001-15)

Meeting with Tinian & Rota Seaport Operators - Sign-In Sheet



Saipan Seaport Conference Room, 13 March 2018, 3:00 p.m.

#	NAME	AGENCY / COMPANY (as applicable)	TELEPHONE (optional)	E-MAIL (optional)
1	JOHN Reyes	GPCC	285-5646	JSReyes98@yahooko.w
2	WILFREDO M. CUESTA	HUANOSTUN CORP.	235-6667	
3	REINA GAMACHO	CNMI CUSTOMS	664-1699	customs.planning@outlook.com
4	DENN MANGILONA	PEGS		dmangilona@pegsmp.com
5	ROY REYES	PEGS		rreyes@pegsmp.com
6	Skye Aldan	CPA		skye.aldan@cpa.gov.mp
7	Nathan Johns	MES		natejohnson72@yahoo.com
8	DAVID DOUGHERTY	Pacific Marine Enterprises		tjddave@hotmail.com
9	DANILYN VARELA	Pacific Marine Enterprises		pme@pticom.com
10	Wende Prater	CPA	2376500	wprater@cpa.gov.mp
11	JOY ANN DELGUERRERO	CPA		joydlg@cpa.gov.mp
12	MARY TERPRICA	SeaShip	322 9706	mary_terprica@saipanshipping.com
13	Lee Cabrera	Saipan Stevedore Co.	322-9270	lee.cabrera@saisteve.com
14	Anthony Camacho	CPA	669-3556	anthony.camacho@cpa.gov.mp
15	Ed Mandiola	CPA	237-6500	cpa.edmandiola@pticom.com
16	DEAN KOKUBUN	MOFFATT & NICHOL	808 533 2000	DKokubun@MoffattNichol.com
17	CHRISTOPHER MATSON	MOFFATT & NICHOL	7576288222	CMatson@MoffattNichol.com
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# Tinian Harbor Master Plan (CPA-TS-001-15)

Commonwealth Ports Authority (CPA)  
Commonwealth of the Northern Mariana Islands  
Port Operators Meeting

March 13, 2018

## Tinian Harbor Public Meeting - Welcome & Introductions

- CNMI government and CPA representatives and other distinguished guests
  - The Honorable Ralph DLG Torres, Governor
  - The Honorable Victor B. Hocog, Lt. Governor
  - The Honorable Joey P. San Nicolas, Mayor
  - Tinian Legislative Delegation
  - Tinian Municipal Council
  - Kimberlyn King-Hinds, CPA Board of Directors, Tinian Representative
  - Edward B. Mendiola, CPA Deputy Director
  - Antonio L. Borja, Tinian Ports Manager
- Moffatt & Nichol – port planning and engineering consultant to CPA
- Pacific Engineering Group & Services – civil engineering and local coordination



Tinian Harbor Master Plan



## Meeting Agenda

- Welcome and introductions
- Public & Stakeholder Comments
- Scope of Master Plan
- Condition report
- Findings
- Master Plan recommendations
- Construction cost and phasing plan
- Discussion



*Photo By: Micronesia Environmental Services*




Tinian Harbor Master Plan




## Tinian Harbor Master Plan Scope

- Define the issues
- Document the physical conditions
- Forecast the need
- Develop solutions
- Devise an implementation plan
- Consider the costs
- Present the plan




Tinian Harbor Master Plan




## Tinian Harbor Master Plan Public & Stakeholder Comments

- Deterioration of existing breakwater
- Deterioration/Restrictions imposed by existing piers & wharves
- Lack of berth space:
  - Cargo
  - Fuel
  - Military use of harbor
  - Future cruise and ferry service
- Public access & use of harbor (i.e., small boat berths & ramp, fish cleaning and weighing stations, picnic & BBQ area, boat wash down area, etc.)



Tinian Harbor Master Plan

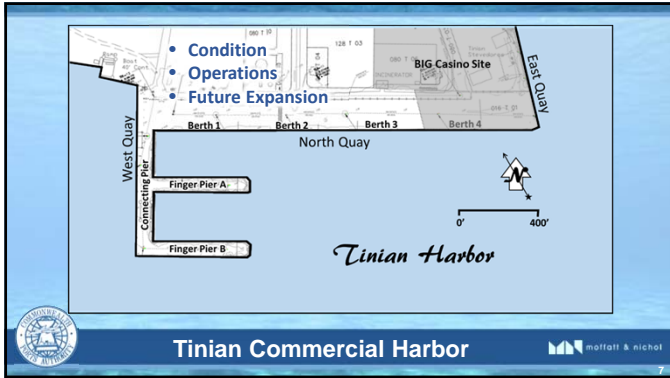



The map shows the Tinian Harbor area with labels for 'Tinian Power Station', 'Former Breakwater Alignment', 'Small Boat Harbor', 'Tinian Seaport', 'Commonwealth Ports Authority Land', 'SAN JOSE MUNICIPALITY', 'House of Taga', 'Tinian Harbor', and 'Philippine Sea'. A scale bar indicates 0 to 400 feet.



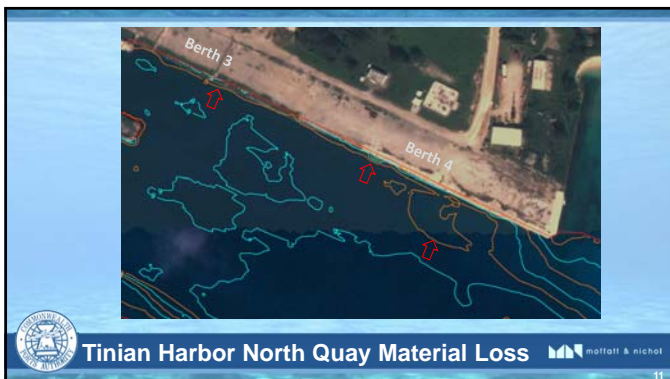
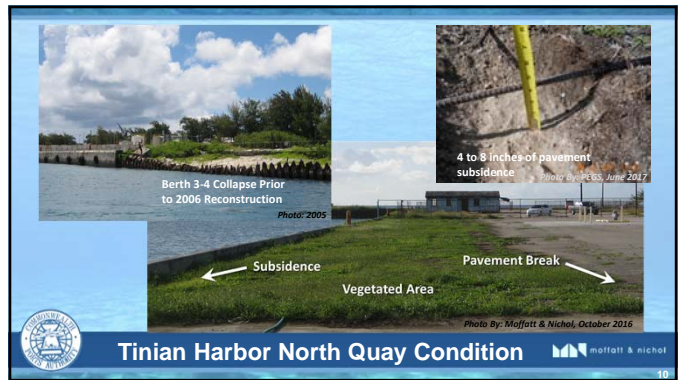
Tinian Harbor General Site Plan





▶ **Berth 1:** Quay wall corrosion, loss of backfill, missing fenders  
 ▶ **Berth 2:** Quay wall corrosion, loss of backfill  
 ▶ **Berth 3:** Quay wall corrosion, loss of backfill, missing fenders

Photos By: Moffatt & Nichol, October 2016  
**Tinian Harbor North Quay Condition**

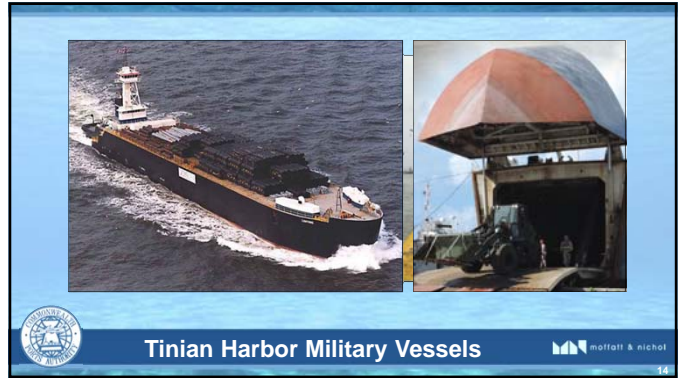




Tinian Harbor Commercial Vessels



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Tinian Harbor Military Vessels



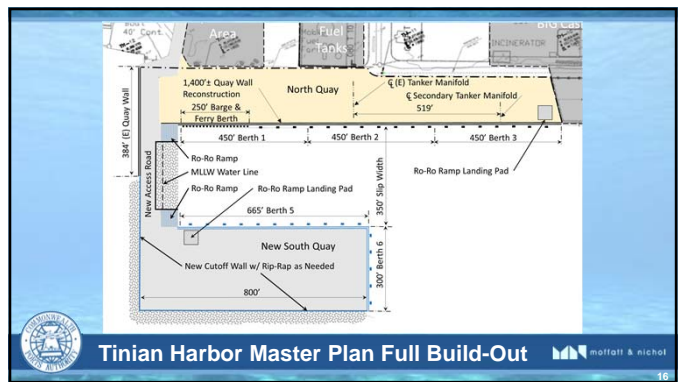
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Tinian Commercial Harbor



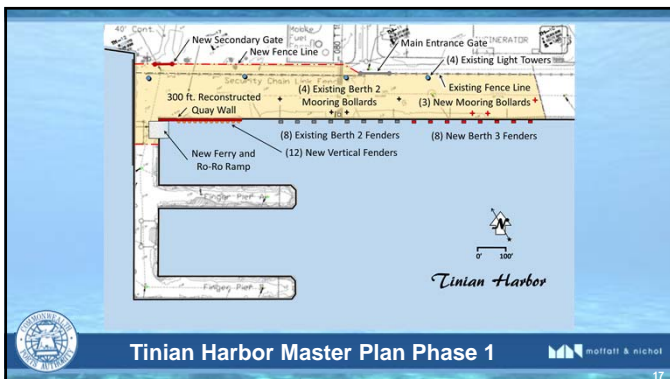
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Tinian Harbor Master Plan Full Build-Out



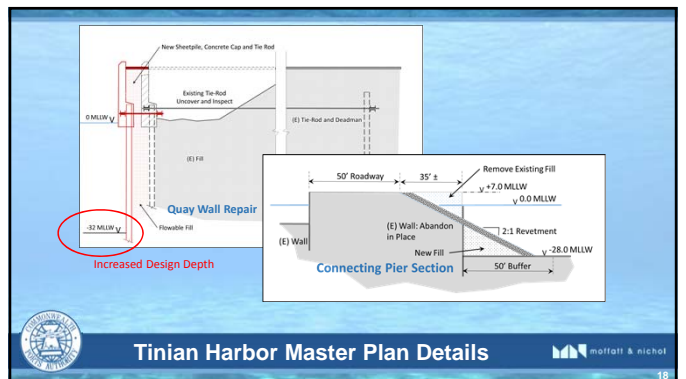
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Tinian Harbor Master Plan Phase 1



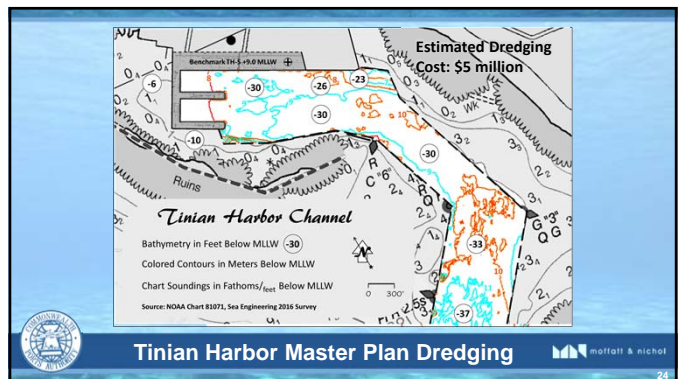
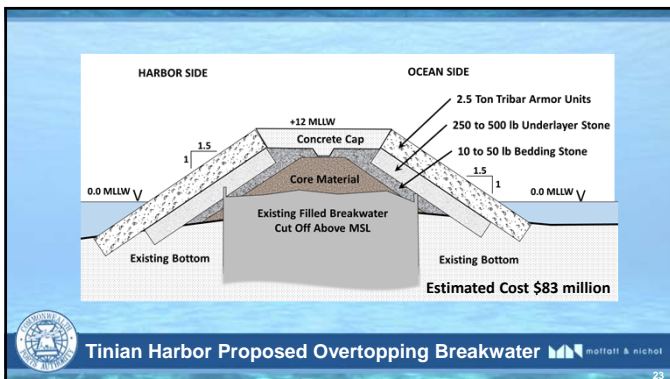
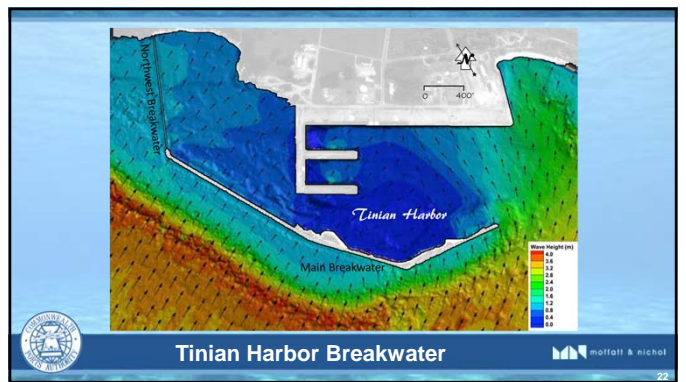
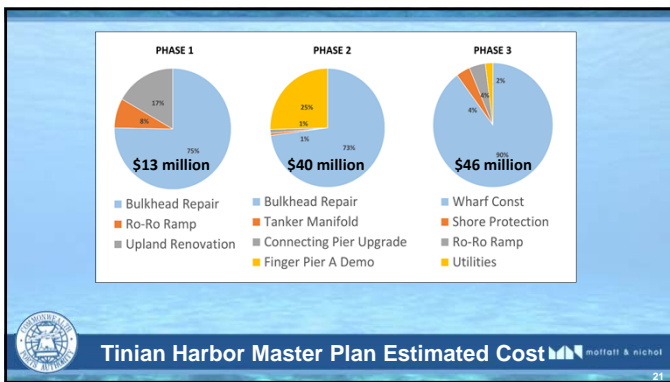
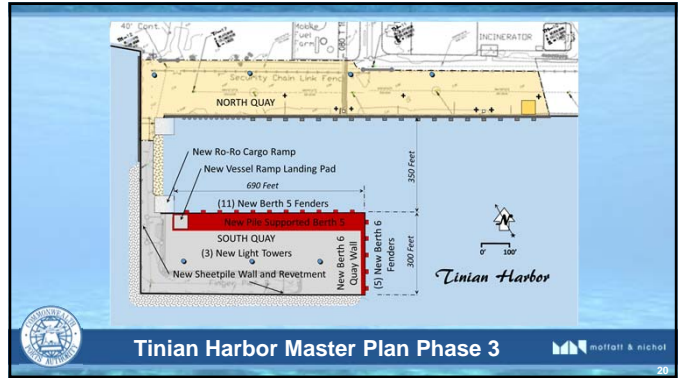
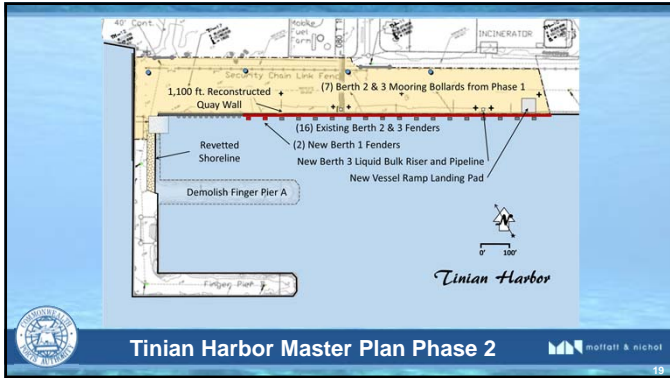
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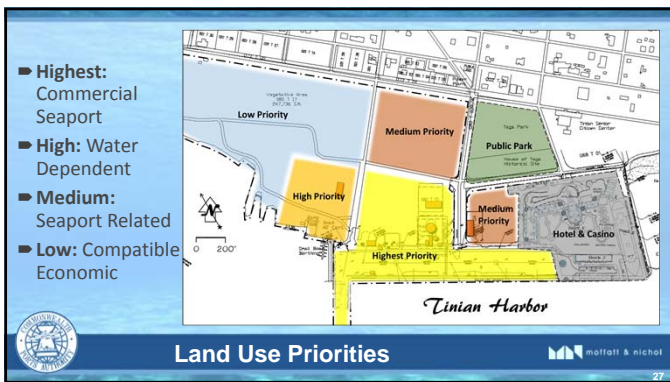
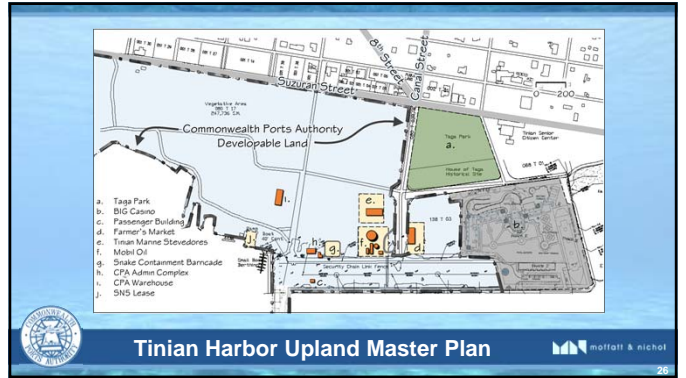


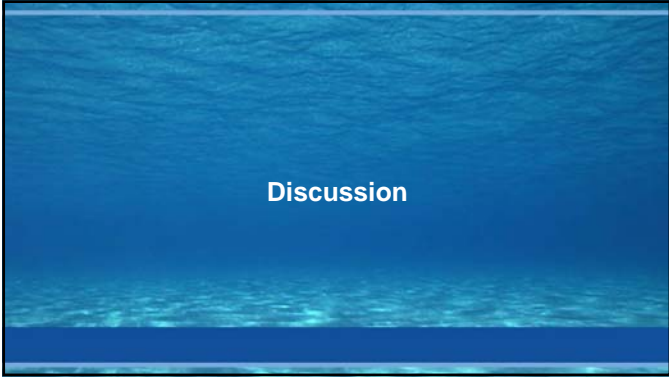
Tinian Harbor Master Plan Details



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# Rota West Harbor Master Plan (CPA-RS-001-15)

Commonwealth Ports Authority (CPA)  
Commonwealth of the Northern Mariana Islands  
Port Operators Meeting

March 13, 2018




## Rota West Harbor Public Meeting - Welcome & Introductions

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Rota West Harbor Master Plan 

## Meeting Agenda

- Welcome and introductions
- Public & Stakeholder Comments
- Scope of Master Plan
- Condition report
- Findings
- Master Plan recommendations
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Photo by: Micronesian Environmental Services



Rota West Harbor Master Plan 

## Rota West Harbor Master Plan Public & Stakeholder Comments


- Reliable & safe cargo delivery
- Channel & breakwater improvements
- Limitations of existing crane
- Unregulated/Uncontrolled offloading of cargo at small boat marina
- Facilitating safe offloading of cargo from light vessels
- Maintaining public access to harbor




Rota West Harbor Master Plan 

## Rota West Harbor Master Plan Scope

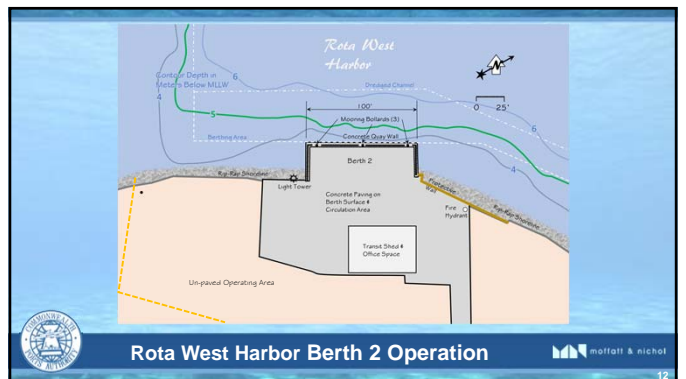
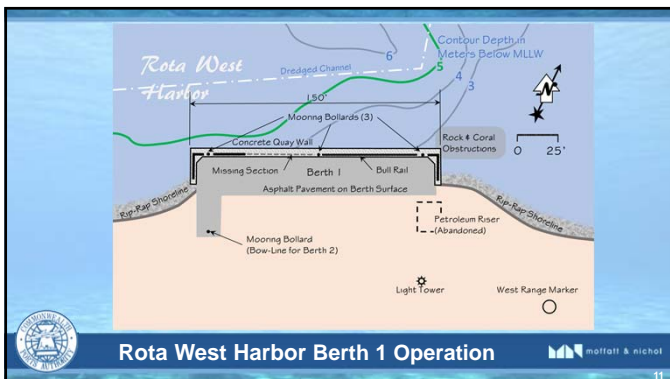
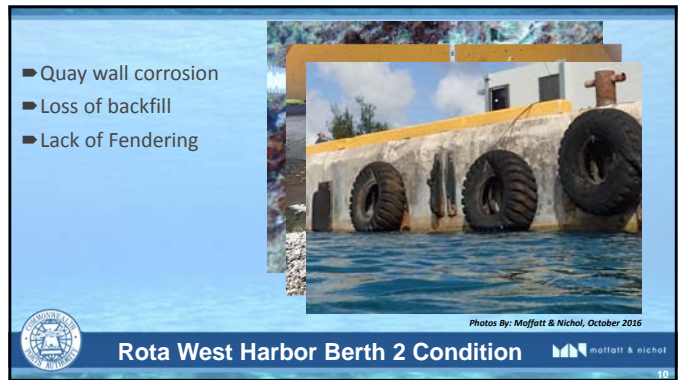
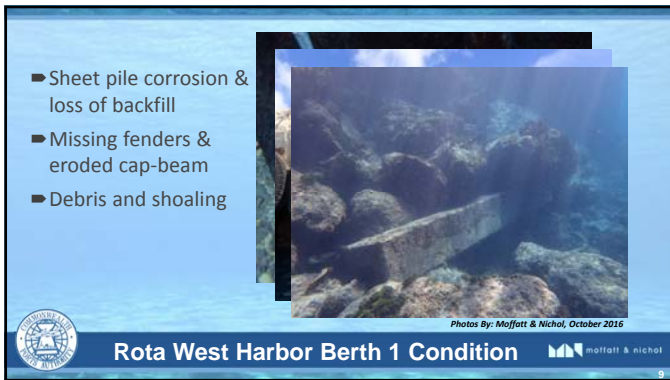
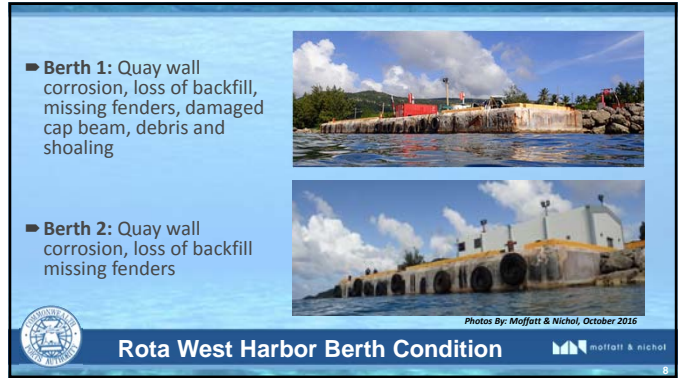
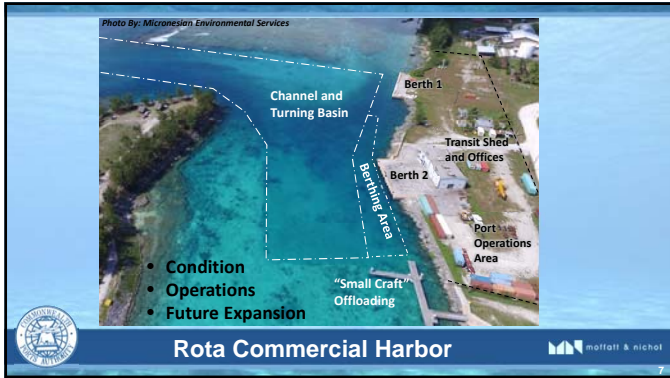
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- Present the plan

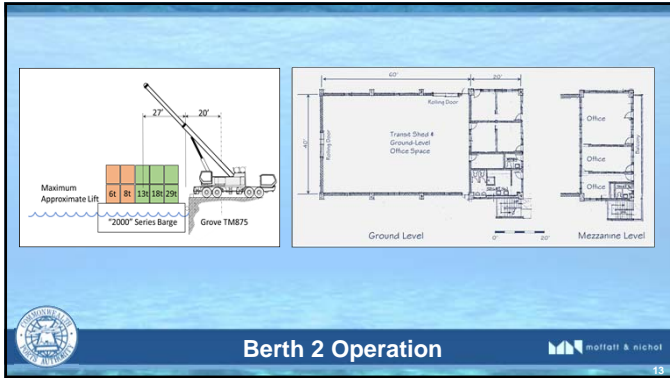


Rota West Harbor Master Plan 

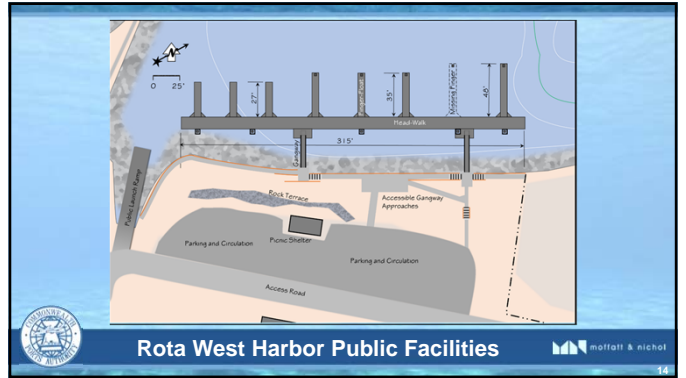



Rota West Harbor General Site Plan 

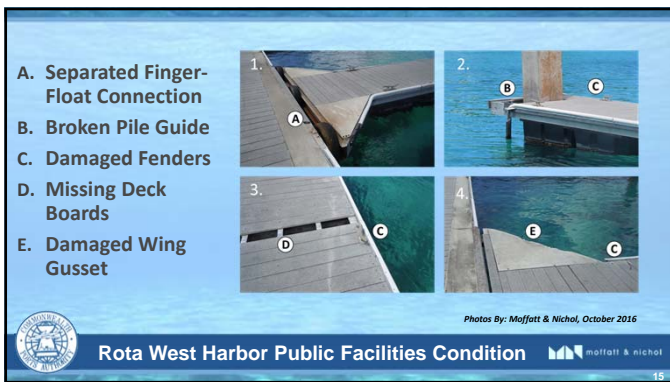




Berth 2 Operation



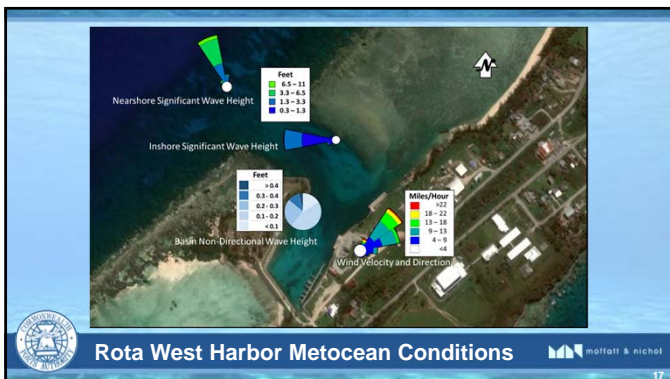
Rota West Harbor Public Facilities



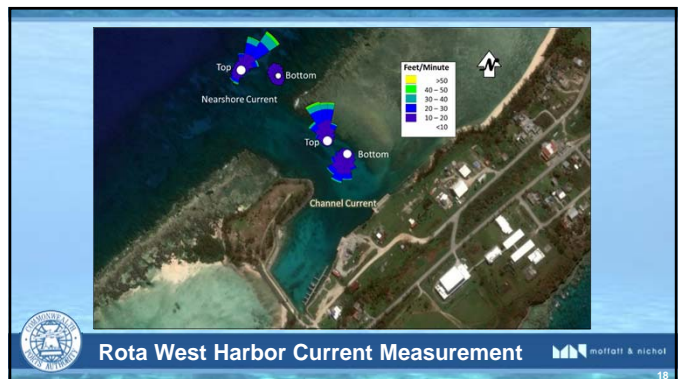
Rota West Harbor Public Facilities Condition



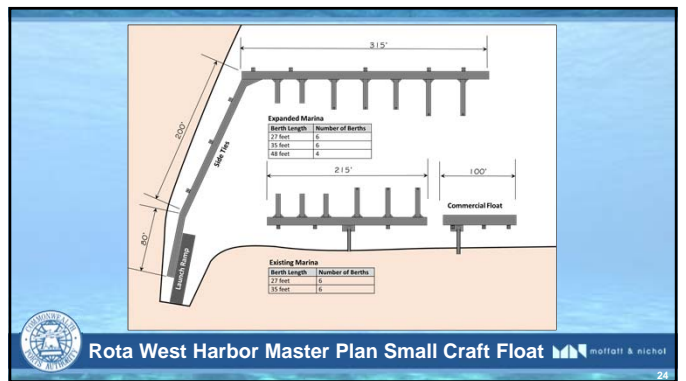
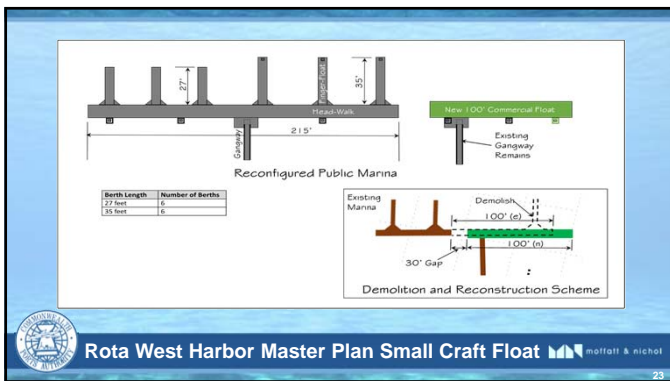
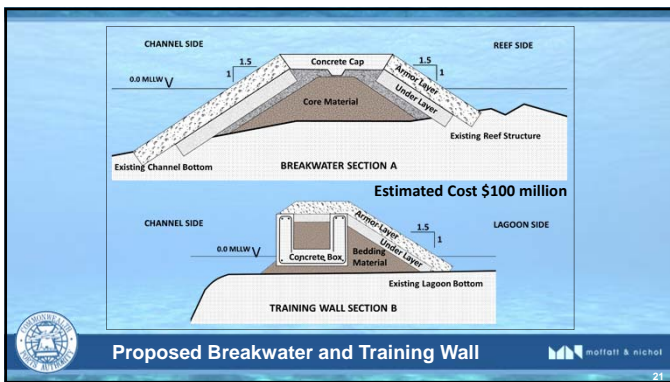
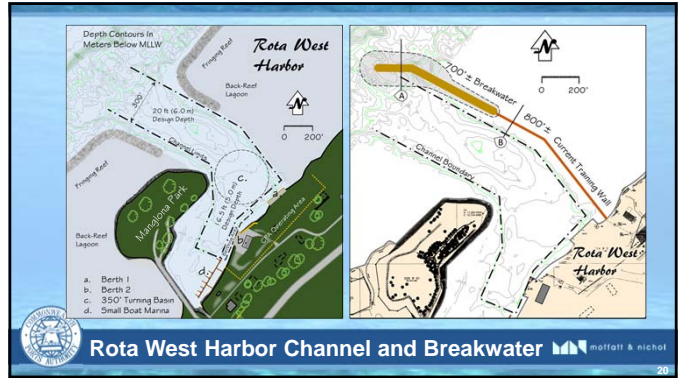
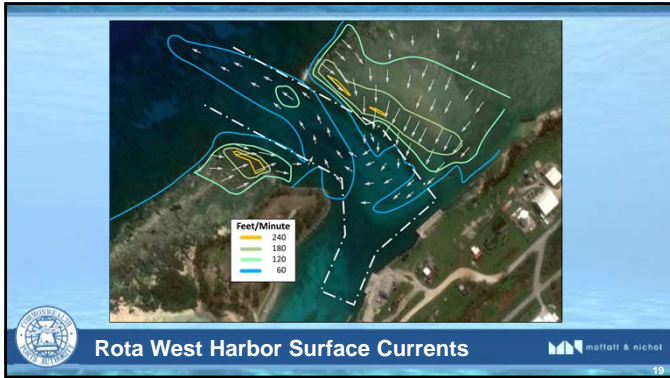
Rota West Harbor Design Vessels



Rota West Harbor Metocean Conditions



Rota West Harbor Current Measurement



**Phase I Cost: \$3.4 million**

- Berth 2 upgrades
- Second crane
- New commercial float
- Storage improvements
- Misc. repairs

**Phase I Improvements**

- New fenders on Berth 2
- Demol 100' of ramp and pier
- New commercial float
- Small boat loading area
- Extended port security fence

**Rota West Harbor Master Plan Phase 1** molfalt & nichol

**Phase II Cost: \$3.9 million**

- Berth 2 upgrades
- Marina and boarding float
- Breakwater Cost Share: \$25 million (est.)

**Phase II Improvements**

- Two 50' Solutions to Berth 2
- New public repair floats
- New launch-ramp boarding float
- Tree snake confinement area

**Rota West Harbor Master Plan Phase 2** molfalt & nichol

**Phase III Cost: \$3.4 million**

- Berth 1 upgrades

**Phase III Improvements**

- Berth 1 Rehabilitation
- Secure Contractors Storage Area
- Boat Repair & Storage
- Marine Supplies & Charters
- Restaurants & Entertainment
- Picnic Areas w/ Shelter & Toilets
- Public Parking

**Rota West Harbor Master Plan Phase 3** molfalt & nichol

**Discussion**

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**DATE OF MEETING:** Wednesday, March 14, 2018 **TIME:** 2:00 p.m. CHST  
**LOCATION:** Office of the Tinian Ports Manager **WRITTEN BY:** Moffatt & Nichol  
(D. Kokubun, C. Matson)  
**PROJECT TITLE:** Tinian Harbor Master Planning Services (Project No. CPA-TS-001-15) **MN PROJECT:** 9538  
**SUBJECT:** Meeting with Tinian Ports Manager

---

**PARTICIPANTS:** See attached *Port of Tinian Meeting - Sign-In Sheet*

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**REFERENCE DOCUMENTS:** • Tinian Harbor Master Plan (CPA-TS-001-15) Meeting Presentation, dated March 14, 2018 (6 sheets)

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## ITEM

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***Presentation (by Moffatt & Nichol)***

Christopher Matson of Moffatt & Nichol (MN) presented the Tinian Harbor Master Plan and the presentation. The presentations are attached herewith.

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***Summary of other items discussed***

- a. *Akri* operates fuel service from Palau to Tinian.
  - b. Vessels may offload cargo directly at Tinian Harbor, without stopping at Saipan first, if prior coordination is initiated with U.S. Customs & Border Protection (CBP) so CBP may provide an agent(s) from Saipan to receive the vessel. The CNMI Bureau of Environmental Health is also called to inspect the cargo.
  - c. Concern had been previously raised over the time required for the military to offload its cargo during recent training operations – i.e., 4-days – since cargo could only be offloaded during daylight hours since the yard lights were not operational. The Commonwealth Ports Authority (CPA) plans to repair the yard lights as fast as they can with its available budget.
- 

***Any additional comments should be sent to Wendi Prater within one week.***

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~ End Notes of Meeting ~

TINIAN HARBOR MASTER PLAN (PROJECT NO. CPA-TS-001-15)

Meeting with Tinian Ports Manager - Sign-In Sheet

Tinian International Airport, Office of the Tinian Ports Manager, 14 March 2018, 2:00 p.m.

#	NAME	AGENCY / COMPANY (as applicable)	TELEPHONE (optional)	E-MAIL (optional)
1	Antonio L. Borja	CPA	433-2294	alborja@cpa.gov.mp
2	Wendy L. Prater	CPA	237-76500	wprater@cpa.gov.mp
3	JOY ANN DELGUERRERO	CPA	237-6500	joydlg@cpa.gov.mp
4	GERALDO CRISOSTOMO	CPA	433-9294	gkcrisostomo@cpa.gov.mp
5	Ed Mendiola	"	237-6500	cpa.edmendiola@pticon.com
6	ROY REYES	PEGS	233-7770	rreyes@pegsmp.com
7	DEAN MANGLONA	PEGS	233-7770	dmanglona@pegsmp.com
8	DEAN KOKUBUN	MOFFATT - NICHOL	8085337000	DKokubun@MoffattNichol.com
9	CHRISTOPHER MATSON	MOFFATT - NICHOL	7576288222	CMatson@MoffattNichol.com
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# Tinian Harbor Master Plan (CPA-TS-001-15)

Commonwealth Ports Authority  
Commonwealth of the Northern Mariana Islands  
Meeting with Tinian Ports Manager

March 14, 2018




## Tinian Harbor Public Meeting - Welcome & Introductions

- CNMI government and CPA representatives and other distinguished guests
  - The Honorable Ralph DLG Torres, Governor
  - The Honorable Victor B. Hocog, Lt. Governor
  - The Honorable Joey P. San Nicolas, Mayor
  - Tinian Legislative Delegation
  - Tinian Municipal Council
  - Kimberlyn King-Hinds, CPA Board of Directors, Tinian Representative
  - Edward B. Mendiola, CPA Deputy Director
  - Antonio L. Borja, Tinian Ports Manager
- Moffatt & Nichol – port planning and engineering consultant to CPA
- Pacific Engineering Group & Services – civil engineering and local coordination



Tinian Harbor Master Plan



## Meeting Agenda

- Welcome and introductions
- Public & Stakeholder Comments
- Scope of Master Plan
- Condition report
- Findings
- Master Plan recommendations
- Construction cost and phasing plan
- Discussion



*Photo By: Micronesia Environmental Services*




Tinian Harbor Master Plan




## Tinian Harbor Master Plan Scope

- Define the issues
- Document the physical conditions
- Forecast the need
- Develop solutions
- Devise an implementation plan
- Consider the costs
- Present the plan




Tinian Harbor Master Plan




## Tinian Harbor Master Plan Public & Stakeholder Comments

- Deterioration of existing breakwater
- Deterioration/Restrictions imposed by existing piers & wharves
- Lack of berth space:
  - Cargo
  - Fuel
  - Military use of harbor
  - Future cruise and ferry service
- Public access & use of harbor (i.e., small boat berths & ramp, fish cleaning and weighing stations, picnic & BBQ area, boat wash down area, etc.)



Tinian Harbor Master Plan



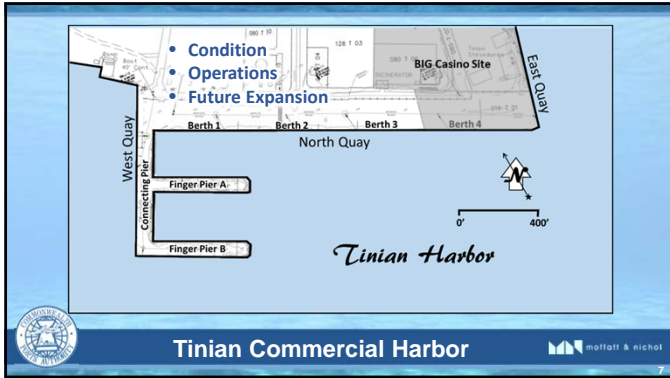

The map shows the Tinian Harbor area with various landmarks and infrastructure. Key features include the Tinian Power Station, Former Breakwater Alignment, Small Boat Harbor, Tinian Seaport, and the Breakwater. Surrounding land parcels are labeled as Commonwealth Ports Authority Land, House of Taga, and SAN JOSE MUNICIPALITY. The map also shows the Philippine Sea to the west and Tinian Harbor to the east. A scale bar indicates 0 to 400 feet.



Tinian Harbor General Site Plan



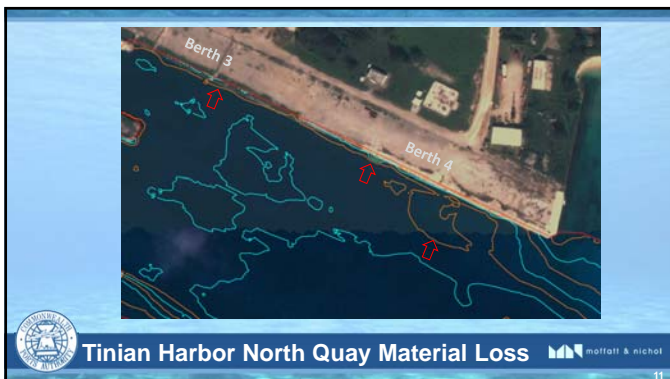
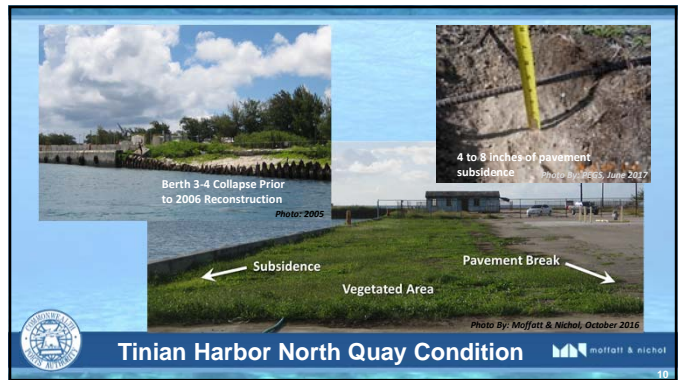




▶ **Berth 1:** Quay wall corrosion, loss of backfill, missing fenders  
 ▶ **Berth 2:** Quay wall corrosion, loss of backfill  
 ▶ **Berth 3:** Quay wall corrosion, loss of backfill, missing fenders

Photos By: Moffatt & Nichol, October 2016

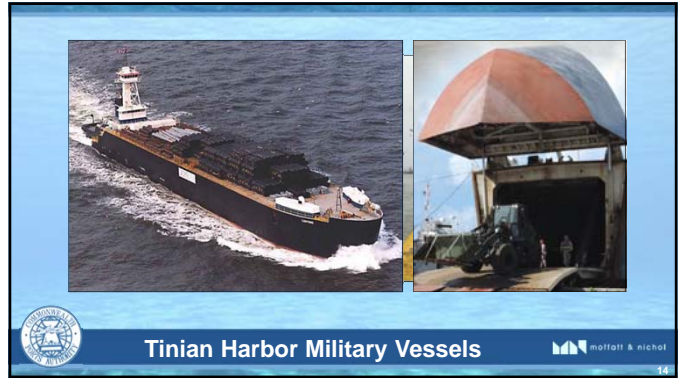
**Tinian Harbor North Quay Condition**





Tinian Harbor Commercial Vessels

moffatt & nichol



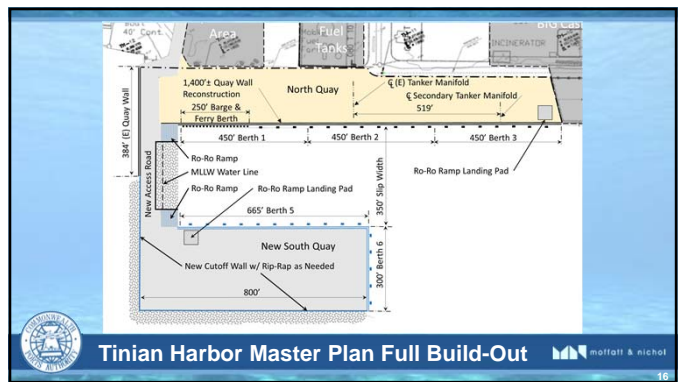
Tinian Harbor Military Vessels

moffatt & nichol



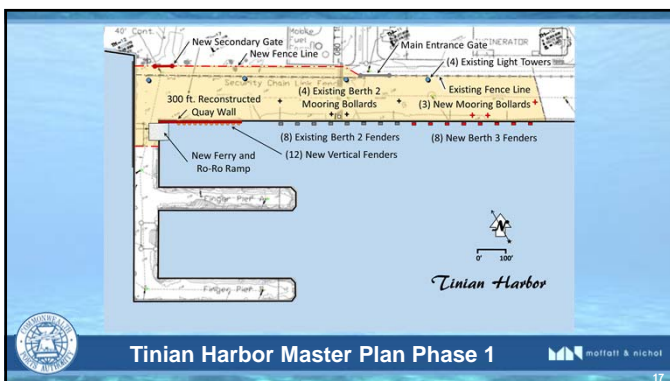
Tinian Commercial Harbor

moffatt & nichol



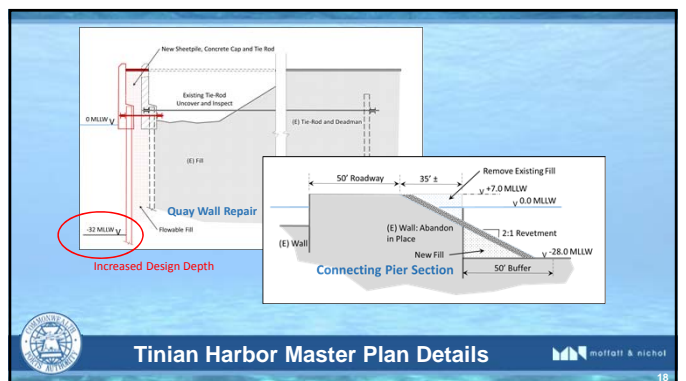
Tinian Harbor Master Plan Full Build-Out

moffatt & nichol



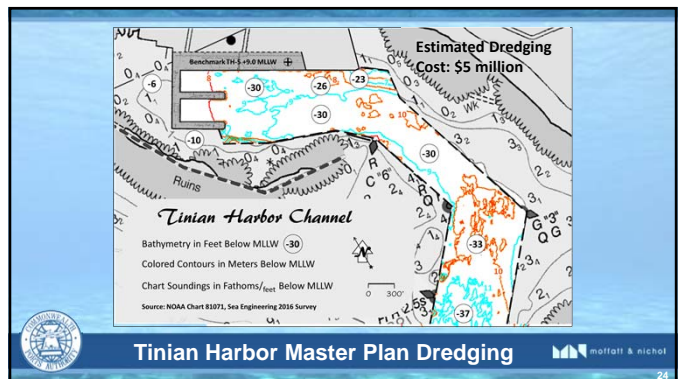
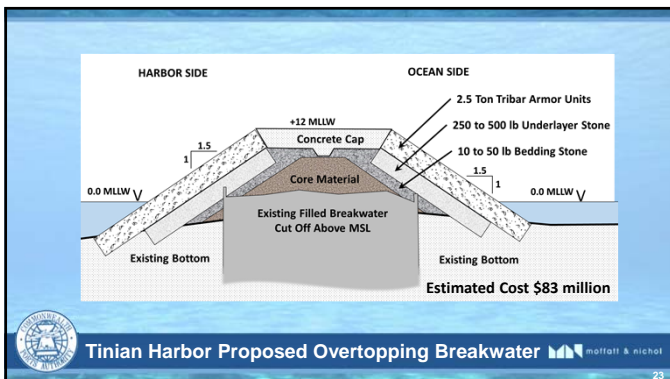
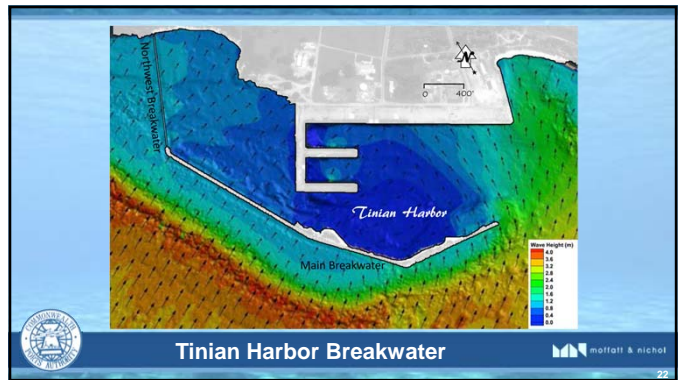
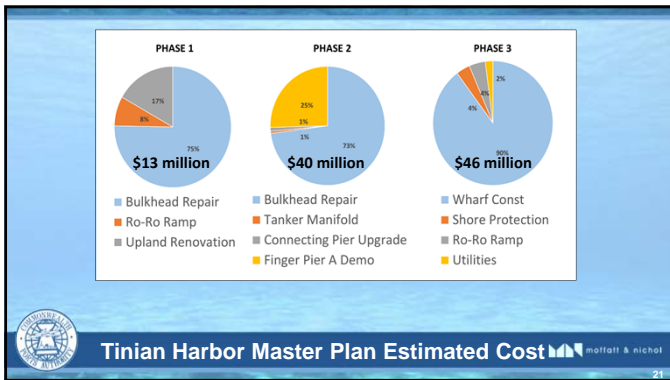
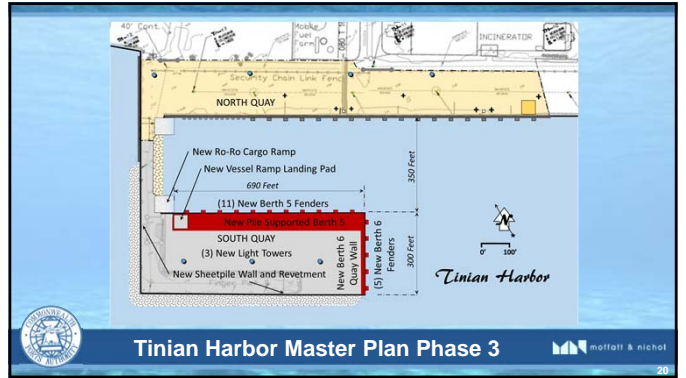
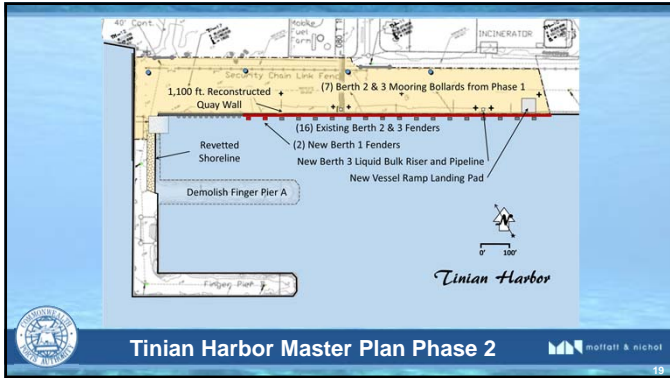
Tinian Harbor Master Plan Phase 1

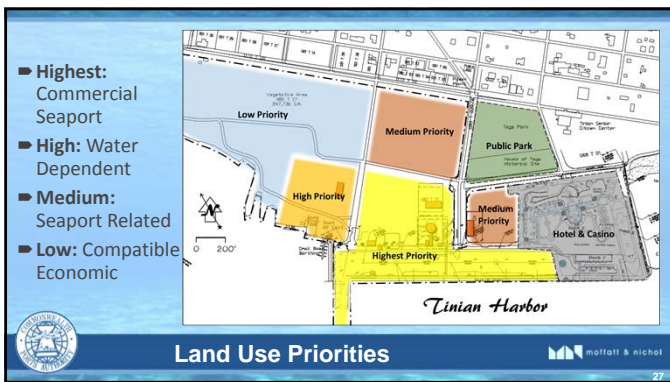
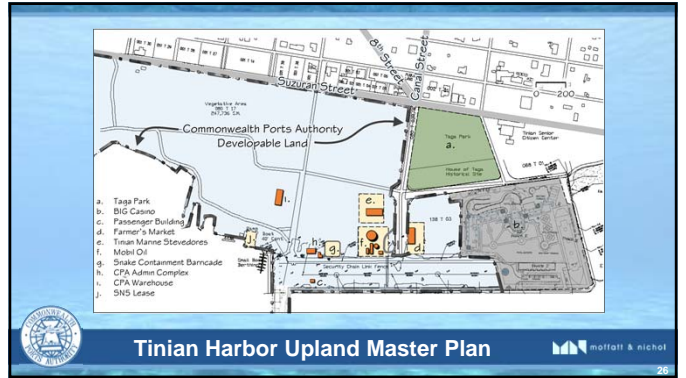
moffatt & nichol

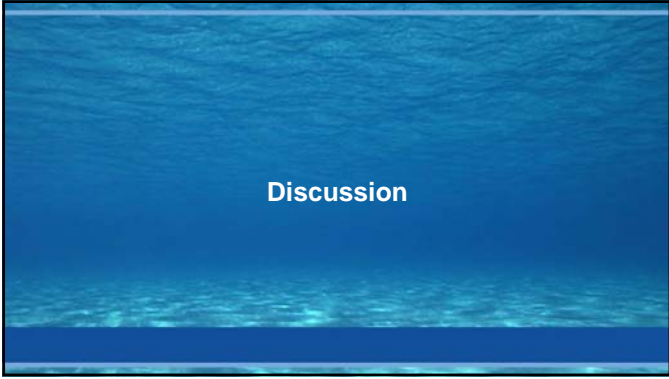


Tinian Harbor Master Plan Details

moffatt & nichol







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**DATE OF MEETING:** Wednesday, 14 March 2018 **TIME:** ~6:30 p.m. CHST  
**LOCATION:** Tinian Courthouse **WRITTEN BY:** Moffatt & Nichol  
(D. Kokubun, C. Matson)  
**PROJECT TITLE:** Tinian Harbor Master Planning Services (Project No. CPA-TS-001-15) **MN PROJECT:** 9538  
**SUBJECT:** Tinian Second Public Information Meeting

---

**PARTICIPANTS:** See attached *Public Information Meeting - Sign-In Sheet*

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**REFERENCE DOCUMENTS:** • Tinian Harbor Master Plan (CPA-TS-001-15) Meeting Presentation, dated March 14, 2018 (6 sheets)

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## ITEM

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### ***Introduction***

Opening remarks were made by the Commonwealth Ports Authority (CPA) Tinian Ports Manager, Mr. Antonio L. Borja.

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### ***Presentation (by Moffatt & Nichol)***

Christopher Matson of Moffatt & Nichol (MN) presented the Tinian Harbor Master Plan presentation. The presentation is attached herewith.

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### ***Summary of discussion on the Tinian Harbor Master Plan presentation***

- A. Question 1: *Could the small boat area support a restaurant / snack shop for boaters?*  
Response 1: Yes, that would be a good amenity to consider for the area, perhaps run by a concessionaire.
- B. Question 2: *Could a copy of the Master Plan and presentation be made available?*  
Response 2: Yes, Ms. Wendi Prater will email the presentation to the attendees who provided an email address on the sign-in sheet.
- C. Question 3: *Does master plan include providing financial advisory services related to the proposed master plan development?*  
Response 3: No, Moffatt & Nichol's (MN) master plan scope does not include those types of services. Financial advisory services must be provided by municipal advisors registered with the Securities and Exchange Commission (SEC), which MN is not.
- D. Question 4: *Can the Medium Priority parcel between new hotel and casino be described more.*  
Response 4: MN will consult with CPA and include additional description of possible uses for the medium priority area and list any proposed uses others may have proposed recently through unsolicited proposals received by CPA.
- E. Question 5: *Are the marina development costs included in the Phase I – III opinions of probable construction costs (OPCC) and, if so, can they be broken down into more refined costs*  
Response 5: The small boat marina development is not included in the original scope of the CPA master plan so the costs are not included in the ports master plan OPCC since the development is not related to cargo and commercial goods movement and, therefore, not under CPA's control. The marina layout was derived from comments from the
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first Tinian Harbor Master Plan public meetings in October 2016 and were incorporated into the CPA master plan to document the good ideas and feedback for others to reference in the future (i.e., the CNMI Department of Land and Natural Resources).  
.....

~ End *Notes of Meeting* ~



TINIAN HARBOR MASTER PLAN (PROJECT NO. CPA-TS-001-15)

Public Information Meeting - Sign-In Sheet

Tinian Court House, 14 March 2018, 6:30 p.m.



#	NAME	AGENCY / COMPANY (as applicable)	TELEPHONE (optional)	E-MAIL (optional)
1	Wendi Prater	CPA	2316500	wprater@cpa.gov.mp
2	Cesarino L. Borja	CPA	433-9294	alborja@cpa.gov.mp
3	JAY ANN DELGADO	CPA	237-6500	joydlg@cpa.gov.mp
4	Ed Mandiola	"	"	cpa.edmandiola@pticom.com
5	Wayney Lizama	MOT PIO	423-3222	waylizama@gmail.com
6	Roy Reyes	PEGS	233-7770	rreyes@pegsmp.com
7	DENN MANGLONA	PEGS	233-7770	dmanglona@pegsmp.com
8	GERALD CRISOSTOMO	CPA	433-9294	gkcrisostomo@cpa.gov.mp
9	Antonio S. Borja	TMC	237-0550	AntonioSBorja@gmail.com
10	Guillermo C. Borja	DLNR	785-0477	gcborja@gmail.com
11	Phillip Long	Bridge Investment Group	433 2624	phil@bridgeinvestmentusa.com
12	MERLY MAGO	PEGS	2337770	mmago@pegsmp.com
13	Rosalina Lazarus	CPA	433-9294	rslazarus82@gmail.com
14	Joy P San Nicolas	MOT	433-1800	jp.tinian@gmail.com
15	DEAN KOKUBUN	MOFFATT   NICHOL	8085337000	dkokubun@MoffattNichol.com
16	CHRISTOPHER MATSON	MOFFATT   NICHOL	7576288222	cmatson@MoffattNichol.com
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# Tinian Harbor Master Plan (CPA-TS-001-15)


Commonwealth Ports Authority  
Commonwealth of the Northern Mariana Islands  
Public Information Meeting

March 14, 2018

## Welcome & Introductions

- CNMI government and CPA representatives and other distinguished guests
  - The Honorable Ralph DLG Torres, Governor
  - The Honorable Victor B. Hocog, Lt. Governor
  - The Honorable Joey P. San Nicolas, Mayor
  - Tinian Legislative Delegation
  - Tinian Municipal Council
  - Kimberlyn King-Hinds, CPA Board of Directors, Tinian Representative
  - Edward B. Mendiola, CPA Deputy Director
  - Antonio L. Borja, Tinian Ports Manager
- Moffatt & Nichol – port planning and engineering consultant to CPA
- Pacific Engineering Group & Services – civil engineering and local coordination



Tinian Harbor Master Plan



## Meeting Agenda

- Welcome and introductions
- Public & Stakeholder Comments
- Scope of Master Plan
- Condition report
- Findings
- Master Plan recommendations
- Construction cost and phasing plan
- Discussion



*Photo By: Micronesian Environmental Services*




Tinian Harbor Master Plan




## Tinian Harbor Master Plan Scope

- Define the issues
- Document the physical conditions
- Forecast the need
- Develop solutions
- Devise an implementation plan
- Consider the costs
- Present the plan




Tinian Harbor Master Plan




## Tinian Harbor Master Plan Public & Stakeholder Comments

- Deterioration of existing breakwater
- Deterioration/Restrictions imposed by existing piers & wharves
- Lack of berth space:
  - Cargo
  - Fuel
  - Military use of harbor
  - Future cruise and ferry service
- Public access & use of harbor (i.e., small boat berths & ramp, fish cleaning and weighing stations, picnic & BBQ area, boat wash down area, etc.)



Tinian Harbor Master Plan

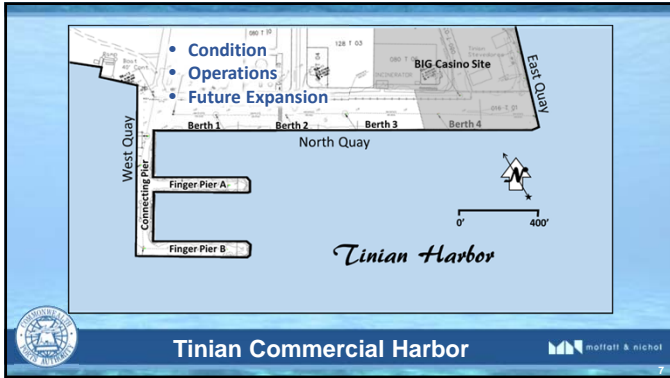



The map shows the Tinian Harbor area with various landmarks and infrastructure. Key features include the Tinian Power Station, Former Breakwater Alignment, Small Boat Harbor, Tinian Seaport, and the Breakwater. The map also shows the surrounding land, including the Commonwealth Ports Authority Land and the House of Taga. The map is oriented with the Philippine Sea to the west and the Tinian Harbor to the east. A scale bar indicates 0 to 400 feet.



Tinian Harbor General Site Plan





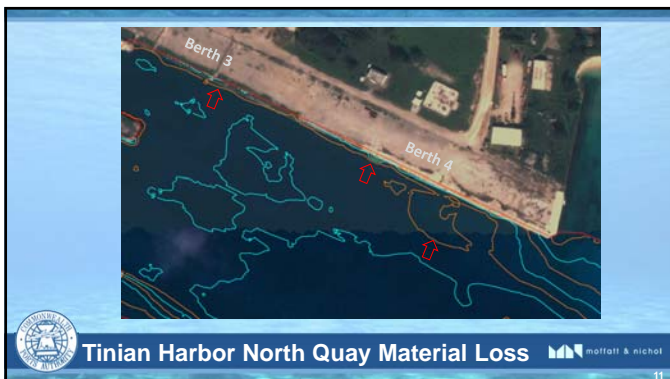
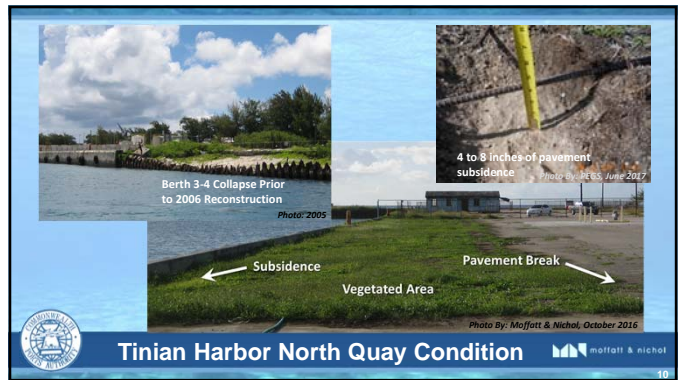
► **Berth 1:** Quay wall corrosion, loss of backfill, missing fenders

► **Berth 2:** Quay wall corrosion, loss of backfill

► **Berth 3:** Quay wall corrosion, loss of backfill, missing fenders

Photos By: Moffatt & Nichol, October 2016

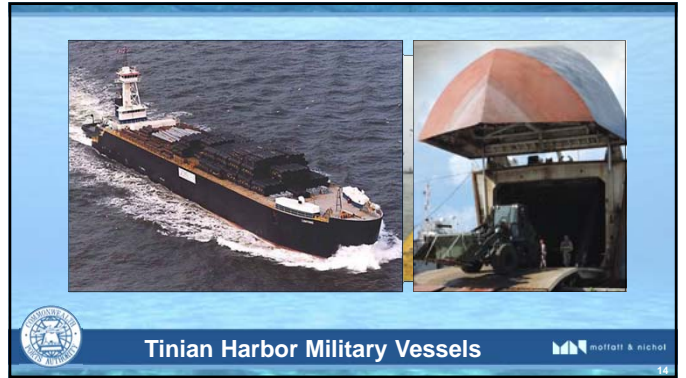
**Tinian Harbor North Quay Condition**





Tinian Harbor Commercial Vessels

moffatt & nichol



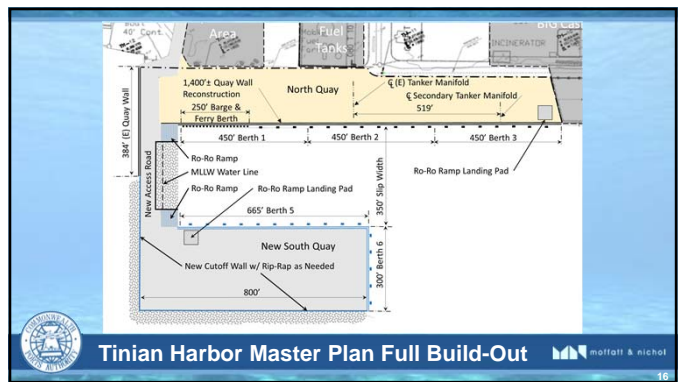
Tinian Harbor Military Vessels

moffatt & nichol



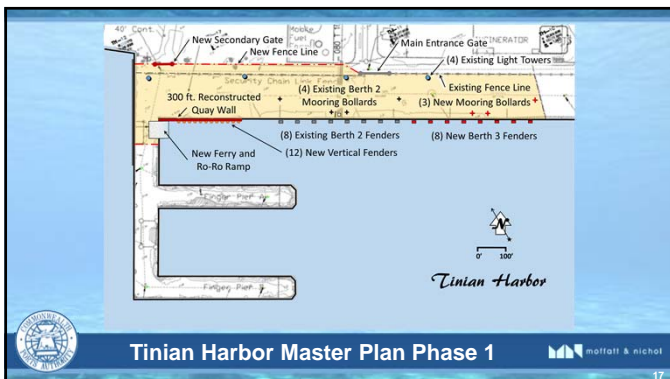
Tinian Commercial Harbor

moffatt & nichol



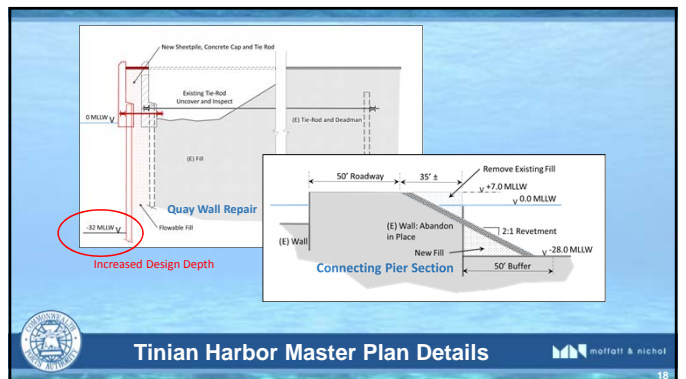
Tinian Harbor Master Plan Full Build-Out

moffatt & nichol



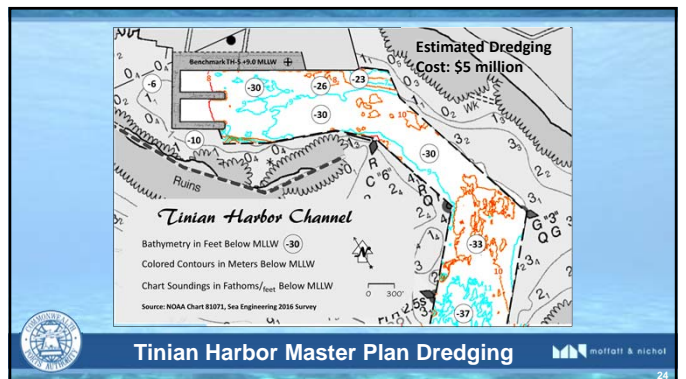
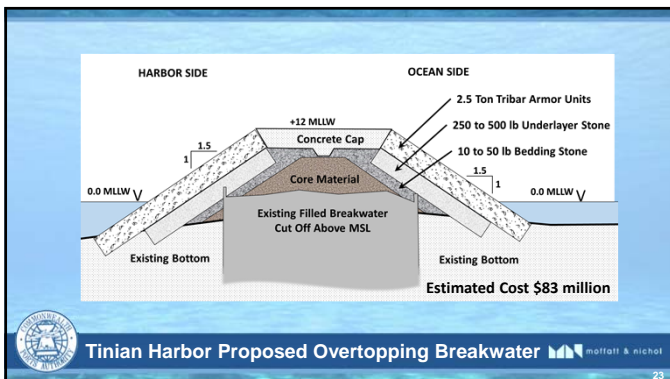
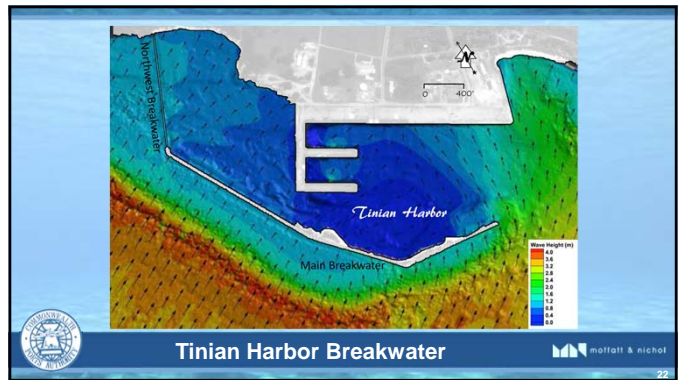
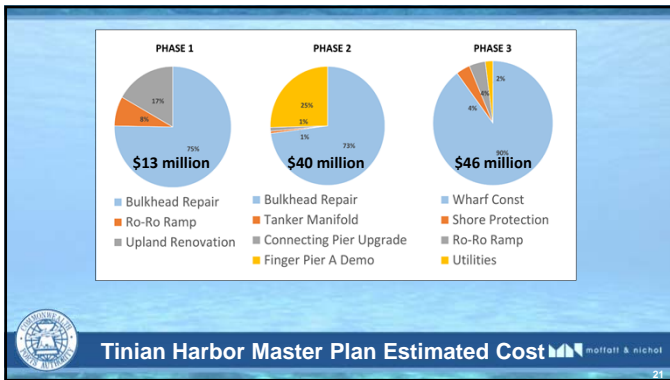
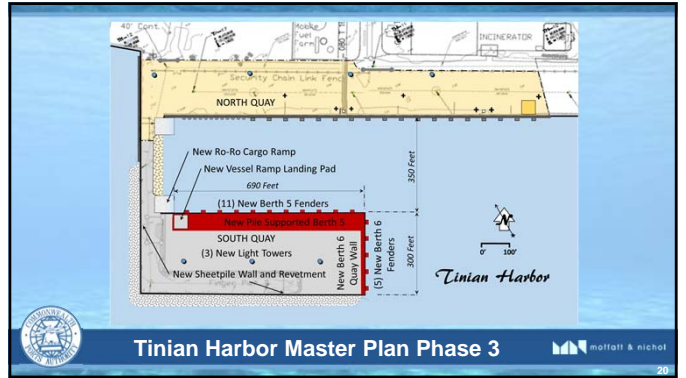
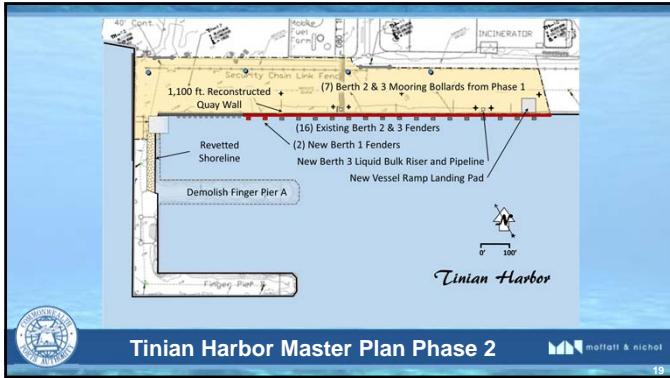
Tinian Harbor Master Plan Phase 1

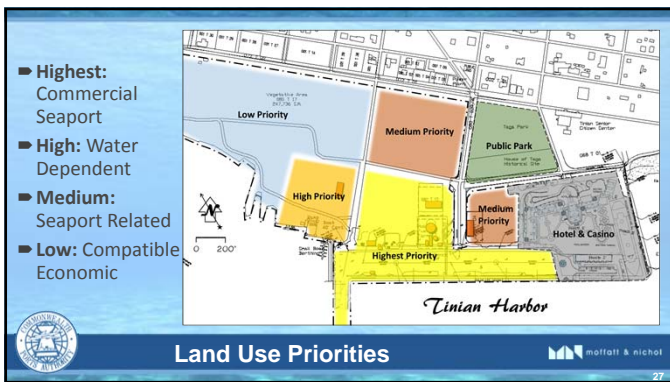
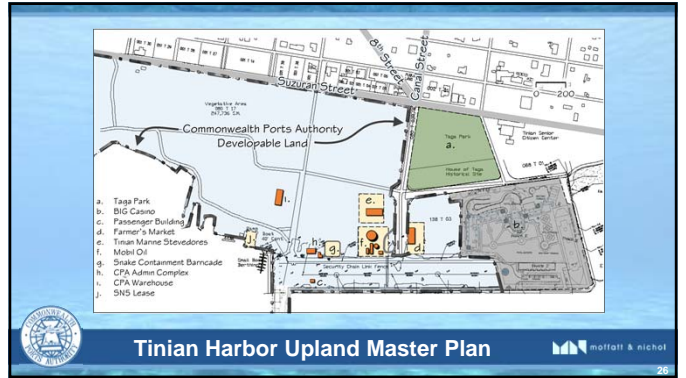
moffatt & nichol

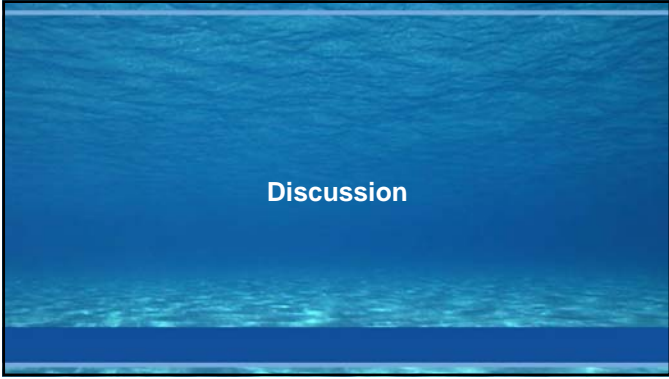


Tinian Harbor Master Plan Details

moffatt & nichol







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**DATE OF MEETING:** Friday, March 16, 2018 **TIME:** 3:00 p.m. CHST

**LOCATION:** Saipan Airport Conference Room **WRITTEN BY:** Moffatt & Nichol  
(D. Kokubun, C. Matson)

**PROJECT TITLE:** Tinian Harbor Master Planning Services  
(Project No. CPA-TS-001-15)  
Rota West Harbor Master Planning Services  
(Project No. CPA-RS-001-15) **MN PROJECT:** 9538 & 9539

**SUBJECT:** Commonwealth Ports Authority Out-Brief Meeting

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**PARTICIPANTS:** See attached *CPA Out-Brief Meeting - Sign-In Sheet*

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## ITEM

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### Summary

1. Public Information Meeting for the Tinian Harbor Master Plan and Rota West Harbor Master Plan were held during the week. The public seemed pleased with the Master Plans and few comments were received.
  2. Tinian Harbor: During the Tinian Harbor Master Plan meeting, an attendee suggested including a list of possible uses for the medium priority area of the conceptual land use priorities plan. A free trade zone, open market, and shops and retail uses have already been suggested in the master plan. Moffatt & Nichol (MN) asked if Commonwealth Ports Authority (CPA) had been approached with proposals for other uses for the area but CPA responded that CPA has not received any proposals recently. CPA may consider issuing a request for proposal for concessionaires for the low and medium priority areas in the future.
  3. Rota Harbor: During the Rota West Harbor Master Plan meeting, an attendee commented the small boat marina slips are not being maintained. Although the small boat marina is on CPA property, the slips are the property of the CNMI Department of Land and Natural Resources (DLNR). DLNR is responsible for maintaining the boat slips.
  4. Deadline for final comments on the draft Master Plans is Friday, 23 March 2018.
  5. MN will send Ms. Wendi Prater a draft final of both Master Plans during the week of 26 March 2018.
  6. Barring receipt of any comments from CPA that require significant changes to the report(s), the Final Reports will be delivered to CPA during the first week of May 2018.
  7. MN to provide thirty hard copies and one electronic copy on compact disc of the final master plan.
  8. MN to provide five 24" x 36" hard copies and one electronic copy of all final layout plans on compact disc.
  9. CPA would like reports to be comb bound with plastic covers (front and rear).
  10. Double-sided printing for final reports is acceptable.
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~ End Notes of Meeting ~

TINIAN HARBOR MASTER PLAN (PROJECT NO. CPA-TS-001-15) and ROTA WEST HARBOR MASTER PLAN (PROJECT NO. CPA-RS-001-15)

Out-Brief Meeting with Commonwealth Ports Authority - Sign-In Sheet

Saipan Airport Conference Room, 16 March 2018, 3:00 p.m.

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## Appendix E Disclaimer and Acknowledgement

Moffatt & Nichol (M&N) devoted effort consistent with (i) the level of diligence ordinarily exercised by competent professionals practicing in the area under the same or similar circumstances, and (ii) the time and budget available for its work, to ensure that the data contained in this report is accurate as of the date of its preparation. This study is based on estimates, assumptions and other information developed by M&N from its independent research effort, general knowledge of the industry, and information provided by and consultations with the client and the client's representatives. No responsibility is assumed for inaccuracies in reporting by the Commonwealth Ports Authority (hereafter "Client"), the Client's agents and representatives, or any third-party data source used in preparing or presenting this study. M&N assumes no duty to update the information contained herein unless it is separately retained to do so pursuant to a written agreement signed by M&N and the Client.

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This document may include "forward-looking statements". These statements relate to M&N's expectations, beliefs, intentions or strategies regarding the future. These statements may be identified by the use of words like "anticipate," "believe," "estimate," "expect," "intend," "may," "plan," "project," "will," "should," "seek," and similar expressions. The forward-looking statements reflect M&N's views and

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This study is qualified in its entirety by, and should be considered in light of, these limitations, conditions and considerations.

## **Appendix F   References and Previous Reports**

1. ADA Standards for Accessible Design, 2010;
2. Final Report Tinian Harbor Condition Assessment and Breakwater Alternative Evaluation, U.S. Army Corps of Engineers, July 2015;
3. Layout and Design Guidelines for Marina Berthing Facilities, State of California, Department of Parks and Recreation Division of Boating and Waterways, July 2005;
4. Marinas and Small Craft Harbors, Tobiasson and Kollmeyer (Second Ed., 1991);
5. Planning and Design Guidelines for Small Craft Harbors, American Society of Civil Engineers (ASCE) Manual No. 50, Third Ed., 2012;

