CNMI 20-Year Highway Master Plan

Draft Report

Commonwealth of the Northern Mariana Islands (CNMI)
Department of Public Works

July 28, 2022

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1 Introduction

The Commonwealth of the Northern Marianas Islands (CNMI) is a commonwealth in political union with the United States, located in the western Pacific Ocean, within the Mariana Islands archipelago. Figure 1.1 presents the CNMI within context of the Pacific Ocean, Micronesia, and adjacent United States territory of Guam. The three main inhabited islands of CNMI are Saipan, Tinian, and Rota. Each of these three islands are unique, with different levels of development, differentiated economies, and varying levels of demand for transportation infrastructure.

Saipan is the largest and most populated island, with the most developed infrastructure and tourism-driven economy. Tinian, immediately south of Saipan, was formerly dominated by a casino resort industry, but is most associated today with its United States military presence. The furthest island south, Rota, is geographically closer to Guam than the other CNMI islands. Rota is the least populated and developed island, currently seeking to expand its “eco-tourism” industry.

The CNMI’s infrastructure and economy were severely affected by the recent Super Typhoon Yutu, which directly hit Saipan and Tinian. The strength and severity of extreme weather events has increased over recent years, likely as a consequence of global climate change, placing additional stress on the islands’ physical transportation infrastructure. In early 2020, the Global Covid-19 pandemic brought the tourism industry on all three islands to an abrupt and extended halt, with visitorship only just starting to recover in 2022. These factors have increased challenges related to funding maintenance and construction of infrastructure, with an increase in capital improvement needs, a decreased supply of local labor, and an increase in costs to import and extract raw materials.

1.1 Objectives

The main objective of this Comprehensive Highway Master Plan is to update the 2008 Comprehensive Highway Master Plan. The Plan identifies transportation issues related to mobility, safety and congestion on the three main islands: Saipan, Tinian and Rota. This Plan identifies goals, policies and improvement needs over the next 20 years for the CNMI transportation system . The plan documents GHD’s evaluation of the transportation system’s current performance and anticipated future performance.

A comprehensive Highway Master Plan for CNMI should accommodate the needs of each island, while also integrating their common needs into a unified transportation plan.

This Master Plan will provide a unifying framework for future transportation planning in the CNMI through the following actions:

– It identifies a roadway classification scheme that will assist the Department of Public Works in prioritizing transportation improvements.
– It identifies deficiencies and constraints in both the existing and expected future transportation network and provides short-range and long-range recommendations for improvements to alleviate such deficiencies. These recommendations are also detailed for each of the three main islands.

1.2 Project Approach

This Highway Master Plan essentially updates the technical analysis of the previous master plan. It provides updated collision data, traffic volumes, and forecasts for future year conditions for each of the three main islands. Due to the Global Covid-19 pandemic, reduced local and visitor traffic was present in CNMI during the preparation of this study.

Roadway segments and intersections were analyzed based on an anticipated return to pre-pandemic visitor levels to estimate traffic capacity and levels of services for both existing and future year conditions and determine necessary transportation improvements to be included in the plan. Improvement costs and funding sources were updated to reflect changes to construction and material costs and to reflect current funding programs available to CNMI.

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Map Projection: Transverse Mercator
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Grid: NAD 1983 MA11 UTM Zone 55N

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Commonwealth of the Northern Mariana Islands
20-Year Highway Master Plan

CNMI Regional Context Map

Project No. **11224010**
Revision No. **-**
Date **Jun 2022**

FIGURE 1-1

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Print date: 29 Jun 2022 - 11:41

Data source: Charted Territory: Esri, Garmin, FAO, NOAA, USGS
Charted Territory: Esri, HERE, Garmin, FAO, NOAA, USGSCNMI Shorelines, Boundaries: U.S. Census, 2020. Created by: pthornton

2 Socio-Economic Information

2.1 Population and Workforce

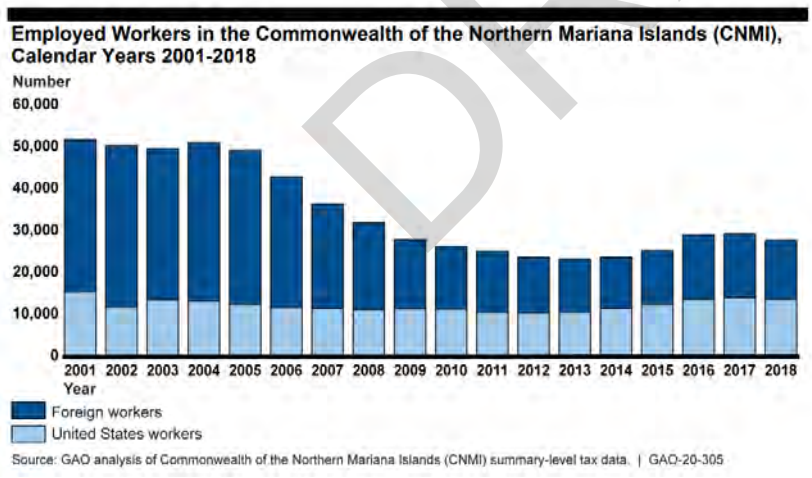
The United States Census Bureau recently published the *2020 Island Areas Censuses* which reported a population of 47,322 in 2020 compared to a 2010 population of 53,883. This 12% decrease in population over the latest decade is a continuation of the demographic trend since 2000. Since 2000, population has decreased 30%. By contrast, the CNMI population grew by 60% between 1990 and 2000. This context has significance for transportation infrastructure needs, as the last two Comprehensive Highway Master Plans were prepared before this sharp shift in population and demographics, and therefore assumed significant increases in traffic to continue. Table 2.1 below shows the CNMI population changes over the past 4 decades, from 1980 to 2020, in Saipan, Tinian, Rota, and the Northern Islands.

Table 2.1 Population by Island (1920 – 2010)

Year	Year over Year Change	Total	Number of Persons			
			Saipan	Tinian	Rota	Northern Islands
2020	**- 12%**	**47,322**	43,385	2,044	1,893	7
2010	**- 22%**	**53,883**	48,220	3,136	2,527	0
2000	**+ 60%**	**69,221**	62,392	3,540	3,283	6
1990	**+ 158%**	**43,345**	38,896	2,118	2,295	36
1980	**-**	**16,780**	14,549	866	1,261	104

Sources: U.S. Census Bureau.

The population trends mirror labor force trends, as shown in the United States Government Accountability Office's (GAO) *CNMI Recent Economic and Workforce Trends (February 2020)*. Since 2001, total workers in CNMI have dropped sharply from about 50,000 to fewer than 30,000 today.



As shown in the inset graph, a significant drop in workforce followed 2005 as the garment industry rapidly left the island. Since 2013, however, a gradual increase in workforce reflected growth in hospitality and gaming industries. This growth was unfortunately reversed in 2018 as a consequence of the destructive Super Typhoon Yutu, that itself followed on the heels of the devastating 2015 Super Typhoon Soudelor.

According to the United States GAO 2022 update to the same study, CNMI workforce has again shrunk from 29,249 in 2016 to 23,840 in 2020. The long-term economic consequences of the on-going Global Covid-19 pandemic are not immediately clear, although the hospitality and gaming industries both continue to struggle to growth following the travel restrictions put in place starting in 2020.

Investment in transportation infrastructure is an essential element of the economic recovery of CNMI, and it is important that we plan for increased transportation needs. However, the current decrease in population and workforce may indicate that infrastructure planned in the prior studies was designed for a far greater increase in traffic than is likely to be realized in the next 15 years, as the forecasts were based on "pre-2010" demographic data and trends.

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Saipan

In 2020, Saipan's population was concentrated in Kagman, Garapan, Chalan Kanoa, Dandan, and Koblerville. The population of the top 14 villages is presented below in Table 2.2. As shown in the table, population concentrations have remained relatively similar between 2010 and 2020, but have shifted significantly over the preceding decades. However, while some geographic shifts in population are likely to have occurred, a major contributing factor to these shifts is the redistricting of villages. Figure 2-1 presents a map showing population concentrations as of 2020.

Table 2.2 Population by Village, Saipan (1990 – 2020)

Village	2020		2010		2000		1990	
Kagman	4027	16%	4226	15%	3,026	8%	293	1%
Garapan	3096	12%	3,983	14%	3,588	10%	3,904	17%
Chalan Kanoa	2967	12%	3,650	13%	3,108	9%	2,549	11%
Dandan	2922	12%	3,280	12%	2,718	8%	901	4%
Koblerville	2470	10%	2,493	9%	3,543	10%	2,811	12%
San Vicente	1862	7%	2,091	7%	3,494	10%	1,669	7%
Gualo Rai	1841	7%	1,660	6%	2,354	6%	1,746	7%
Susupe	1840	7%	2,078	7%	2,083	6%	1,776	8%
Capitol Hill	979	4%	1,028	4%	1,496	4%	1,234	5%
Tanapag	784	3%	829	3%	3,318	9%	1,602	7%
San Antonio	770	3%	1,149	4%	4,741	13%	2,887	12%
San Jose	681	3%	954	3%	787	2%	839	4%
San Roque	573	2%	741	3%	983	3%	911	4%
Navy Hill	247	1%	260	1%	1,001	3%	419	2%
Totals:	25,059		28,422		36,240		23,541	

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Tinian

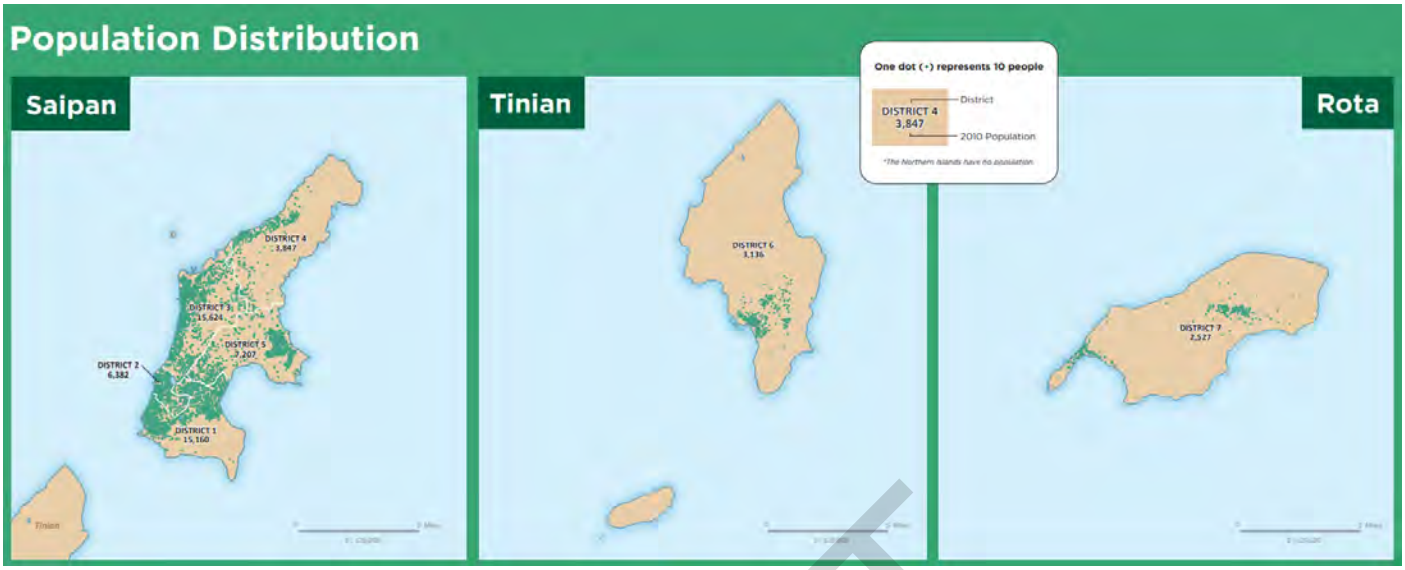
Tinian's population nucleus is located in the village of San Jose, which is also the island's commercial center. As of the 2020 Census, 61-percent of the island's population is in the San Jose village. The balance of the island's population is concentrated in Marpo Heights (21-percent) and Carolina Heights (11-percent) as smaller outlying residential areas. Figure 2-1 presents a map showing population concentrations as of 2020.

Rota

Urbanized areas on Rota consist of Songsong and Sinapalo villages. Songsong is the center of commerce and government for the island. 58-percent of the island's population resides in Sinapalo and 19-percent resides in Songsong. These two communities are linked by Rota's primary highway, which serves the airport north of Sinapalo and the seaport in Songsong. Figure 2-1 presents a map showing population concentrations as of 2020.

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Figure 2-1 Population Distribution



Source: U.S. Census Bureau, 2020 Census of the Commonwealth of the Northern Mariana Islands

2.2 Household Size & Income

Based on data gathered for the 2016 Household Income and Expenditure Survey, the island with highest median household income was Tinian, having surpassed Rota since the previous Household Income and Expenditure Survey in 2005. Table 2.3 summarizes household and per capita income recorded for 2015.

Table 2.3 Household and Per Capita Income

2015	Household Income (2015 Dollars)			
	CNMI	Saipan	Rota	Tinian
Median Household Income	$ 19,201	$ 19,009	$ 18,911	$ 22,500
Mean Household Income	$ 25,740	$ 25,911	$ 22,666	$ 26,085
Per Capita Income	$ 8,644	$ 8,685	$ 8,375	$ 8,243
Source: 2016 Household Income and Expenditure Survey, data for the year prior (2015)				

The total-percentage of persons in poverty across CNMI was 55.7 in 2015, continuing the increasing trend from 51.8% in 2010 and 30.6% in 2000. The average household size in 2010 was 3.26 people compared to 3.65 in 2000, so the average size decreased. Saipan had the largest households in 2010, but Tinian and Rota had larger families than Saipan in 2010.

2.3 Land Use Patterns

CNMI is formed by a chain of 14 volcanic islands stretching over 375 miles north to south, with a total land area of 181 square miles. Of all those islands, there are three principally inhabited islands: Saipan, Tinian, and Rota.

Saipan

Saipan is the largest island of the CNMI with a total area of 44.55 sq mi (115.39km^2). It is divided into 5 Census Districts and further divided into 34 villages as shown in **Error! Reference source not found.** (note, this map includes the 73 villages prior to recent consolidation in 2022).

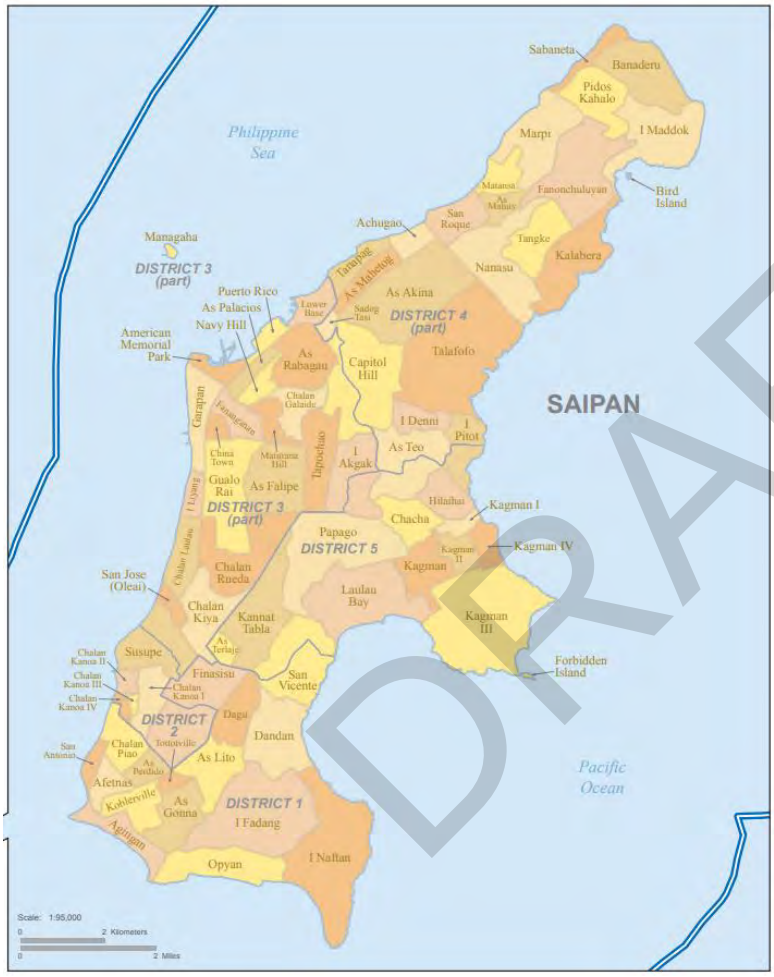
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Census District 1 on Saipan's southern coast bridges the airport area and San Antonio. It includes sixteen mixed residential area villages. Koblerville and San Antonio have populations of 3,543 and 4,741 respectively and are home to the Coral Ocean Golf Course and Resort community which provides a 100-room hotel for its visitors. Route 37 (Chalan Monsignor Martinez), Route 301 (Chalan Monsignor Martinez), Route 32 (As Perdido Road), and Route 31 (Isa Drive) are the primary highway connections in this district.

Census District 2 spans a coastal arc beginning at the southern fringe of Chanlan Kanoa and extends through northern Susupe. It is served primarily by Route 33 (Beach Road) and to a lesser extent by ed Road for north- south mobility. In addition, Route 32 (As Perdido Road) and Route 31 (Chalan Monsignor Guerrero) serve the traffic generated in this area from the east to the west direction.

Figure 2-2 Saipan Census Districts



Along the western coast north of District 2, District 3 features the village of Garapan, San Jose, Navy Hill, Gualo Rai, among others. This District is the most urbanized. Offshore to the north is Tanapag Harbor. Garapan is the hotel/tourism District with a higher density of commercial, retail and hotels serving the tourist population. Several major hotels including Dai Ichi Hotel, Hyatt Regency and the Hafa Adai Hotel are located in this District.San Jose contains a mixture of residential and commericial uses, again with commercial uses dominating both sides of Route 33 (Beach Road). Beach Park offers a good view of the lagoon offshore. Route 31 (Chalan Monsignor Guerrero) defines the northern edge of San Jose and provides area residents with access to Route 30 (Middle Road) and to the airport further inland.

District 4 makes up the northern portion of the island, and consists of primarily open space and undeveloped mountainous region. It includes the village of Tanapag and runs from the island's northwestern coast across the Talofofo ridge line to the As Teo-Chacha area. This area includes much of Capital Hill, the center of governmental operations. Route 30 (Middle Road) is the most important roadway in this District. Route 31 (Isa Drive) ties into Route 30 (Middle Road) at the base of Capitol Hill, providing access to residential communities and government offices inland.

District 5 spans the central and eastern mountainous region as well as the coastal community of Kagman and the Lao Lao Bay Gold Course. It is located north of the airport in District 1.

Tinian

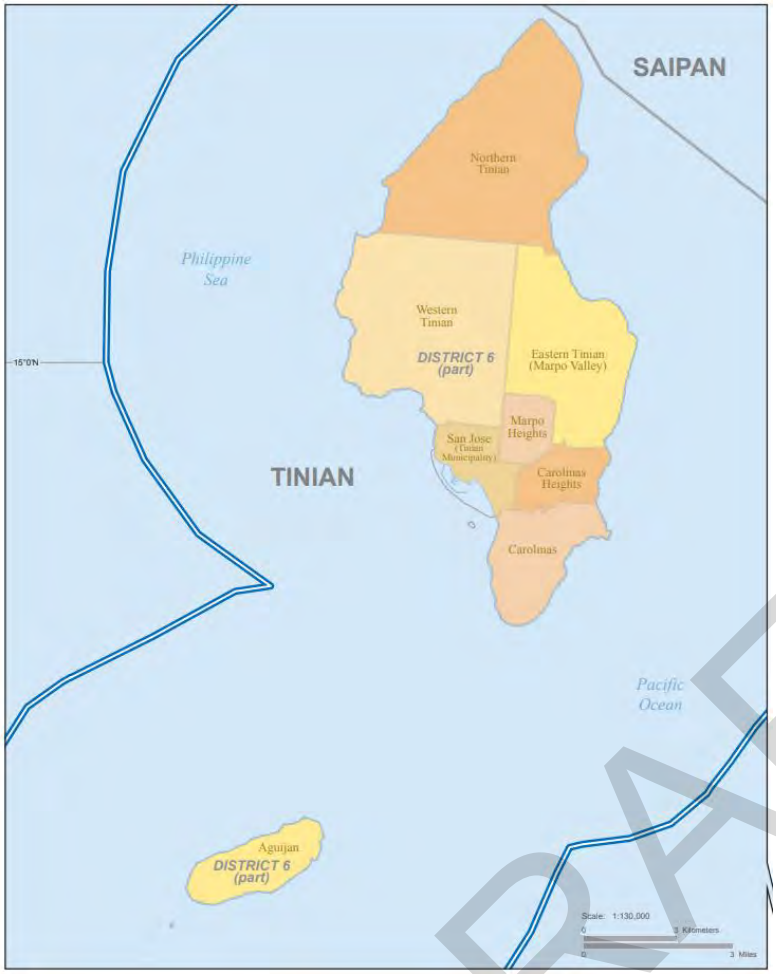
Tinian is the third largest island of the Mariana Islands. It is located approximately 4.5 km southeast, across the Saipan Channel, from Saipan. It has a land area of 101.01 km^2 (39 sq. mi.). Tinian is primarily an agricultural community with most of its population residing in San Jose followed by Marpo Valley. The majority of the areas in Tinian have been leased to the U.S. Federal Government for military contingency purposes. The "Military Retention Zone" (MRZ) boundary divides the island into northern and southern segments and approximately divides the island's single census District. Figure 2-3 Rota Census Districts

3 provides a Census District and Village map of the island of Tinian.

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Figure 2-3 Rota Census Districts



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The entire island of Tinian is considered District 6. The Tinian International Airport is positioned atop a plateau in the central west corner of the island inside the MRZ. Along the island's northwestern coast is the new home to a Voice of America (VOA) radio relay station. The United States Information Agency, which has headquarters in Washington, D.C., chose Tinian as the site to build a new radio relay station to transmit VOA broadcasts. The VOA currently broadcasts more than 900 hours of programming weekly in 47 languages.

The southern portion of the island contains the main village of San Jose on the southwestern coast and the low density residential area of Marpo. The village of San Jose holds most of the island's housing stock and all of the commercial and institutional uses. The Tinian Harbor lies along the coast of San Jose village and features berthing, transshipment and cold storage facilities. This 100 acre harbor has a 1000 foot long commercial dock. The island's power generation plant is in San Jose as well.

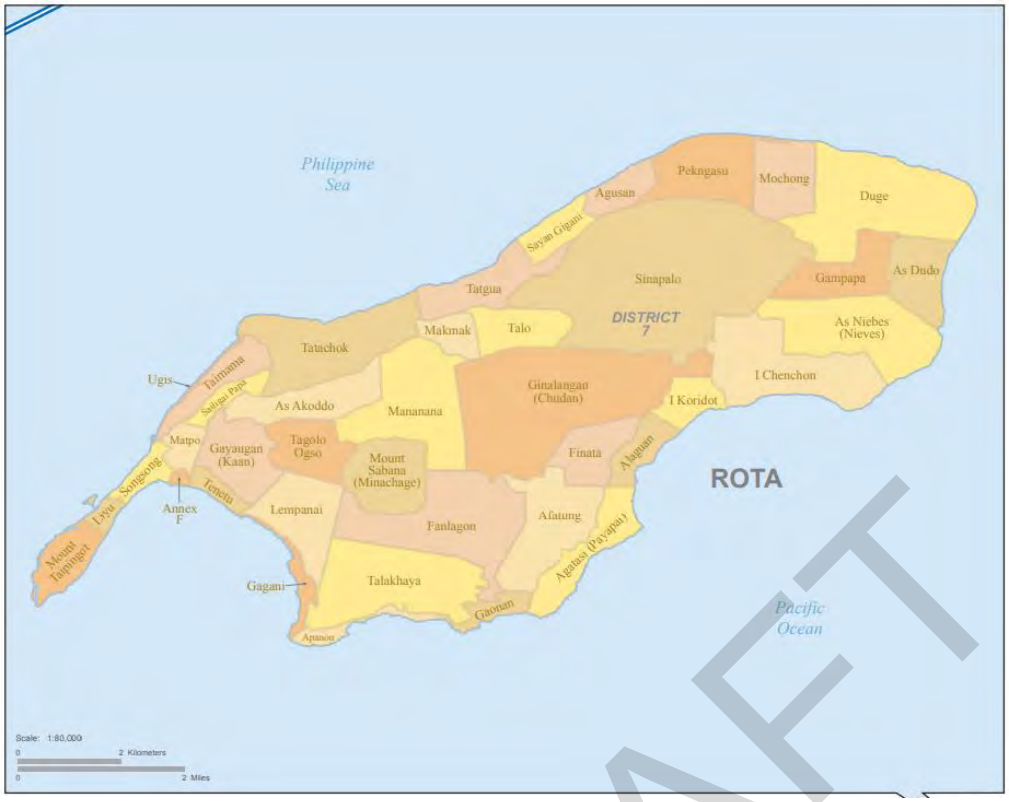
Rota

Rota is the southernmost island in the CNMI with a land area of 85.38 km^2 (32.97. sq. mi.). Most of the island remains in agricultural or natural habitat with a few, scattered agricultural, mixed-use residential, commercial and industrial uses located in the rural interior. Urbanized areas on Rota consist of Song Song and Sinapalo villages. Songsong is the center of commerce and government for the island. These two communities are linked by Rota's primary highway, Route 10, which services the airport in Sinapalo and the seaport in Songsong.

Rota is represented by a single Census District 7 and is comprised of 40 villages. A District and Village map of Rota can be found in Figure 2-4.

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Figure 2-4 Rota Census Districts



Rota's International Airport is located in the central east area of the island, near the village of Sinapalu. Rota's first major hotel and golf course facility, the Rota Resort and Country Club, is located north of the airport and sweeps over 560 acres of lush land.

The southwest portion of the island includes the peninsula of Rota, where the village of Songsong resides. The WWII Japanese Burial Site, Peace Memorial and Rota Zoo can also be found in this district.

2.3.1 Future Land Use Trends

The Department of Public Lanes (DPL) prepared the *CNMI Comprehensive Public Land Use Plan Update for Rota, Tinian, Saipan, and the Northern Islands* in March 2019, which provides overviews of public land use for the three major islands. The following provides a high-level summary of future land use trends for the three islands.

Saipan Future Land Use Trends:

– The nature of tourism is changing in Saipan, including a shift to apartment-based vacation rentals.
– Many of Saipan's conservation areas are located along the coastline in designated conservation areas. These lands contribute to the quality of life on Tinian and attract visitors and should be maintained.
– Future land uses on public land through approximately 2029 include identifying:
  - The future Kagman Reservoir.
  - A potential village homestead site in coordination with DPL staff;
  - Potential sites for future wastewater facility, and
  - New school sites to move public schools out of the Tsunami Inundation Zone.

Tinian Future Land Use Trends:

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– Most of CNMI's future planned labor demand is for development on the island of Tinian, where two casino resorts have been proposed. However, the likelihood of these projects materializing is uncertain.
– Many of Tinian's conservation areas are located along the southern portion of the island. These lands contribute to the quality of life on Tinian and attract visitors and should be maintained.
– Future lane use of public lands proposed include:
    - A location in San Jose for civic uses;
    - Roadway development (Route 205);
    - Village and agricultural homesteads in Kastiyu and Carolina areas;
    - Future agricultural use land on the eastern side of the island, and
    - Public land identified for economic development in the southern portion of the island.

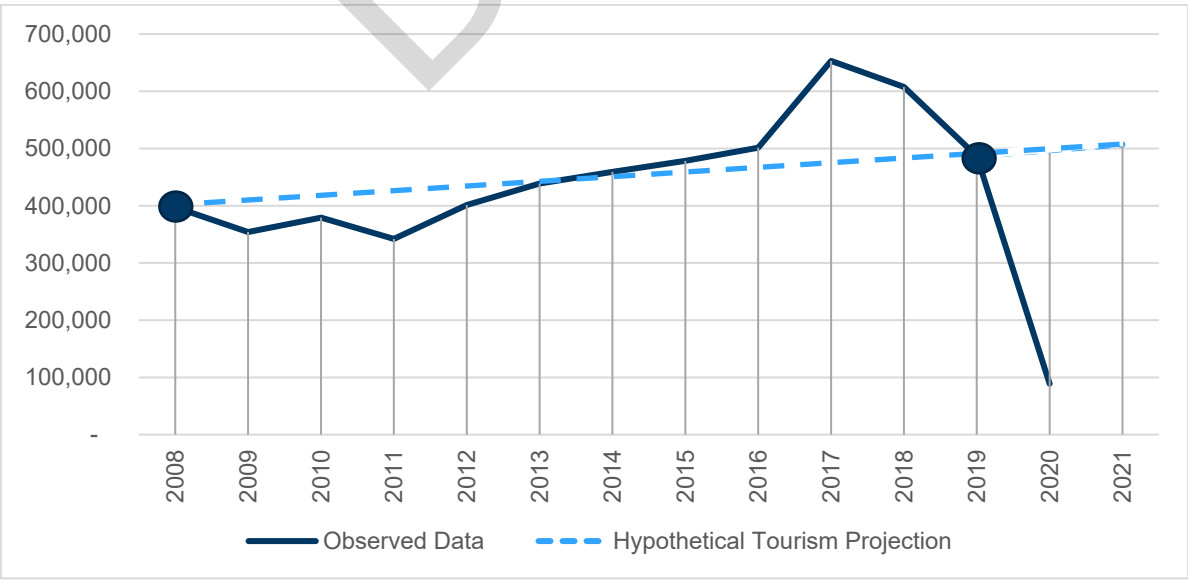
Rota Future Land Use Trends:

– There are no current likely prospects for casino development on Rota.
– Rota has recognized wildlife and shoreline conservation areas that are proposed to remain in conservation.
– Future public land uses include:
    - Identification of agricultural and village homesteads;
    - A potential visitor and cultural center near wedding cake;
    - A location near the Mayor's office to consolidate civic uses;
    - A potential solar farm site, and
    - Potential sites for power plant relocation towards a central location on the island.

2.4 Visitorship Trends

Island visitorship (tourism) data were gathered from the CNMI Department of Commerce economic indicator data. The annual visitor arrivals were reported at 397,271 visitors in 2008, and 487,008 visitors in 2019, an average yearly increase in visitors of 2.1-percent growth per year. Figure 2-4 presents the annual visitorship to CNMI between 2008 and 2020, reported by the CNMI Department of Commerce, as well as a projection based on historical growth trends. In 2020, tourism continued from January to March before dropping to almost zero in the following months due to travel restrictions related to the COVID-19 pandemic. The tourism projection is based on visitorship between 2008 and 2019.

Figure 2-4 Marianas Annual Visitorship, with Hypothetical Tourism Projection



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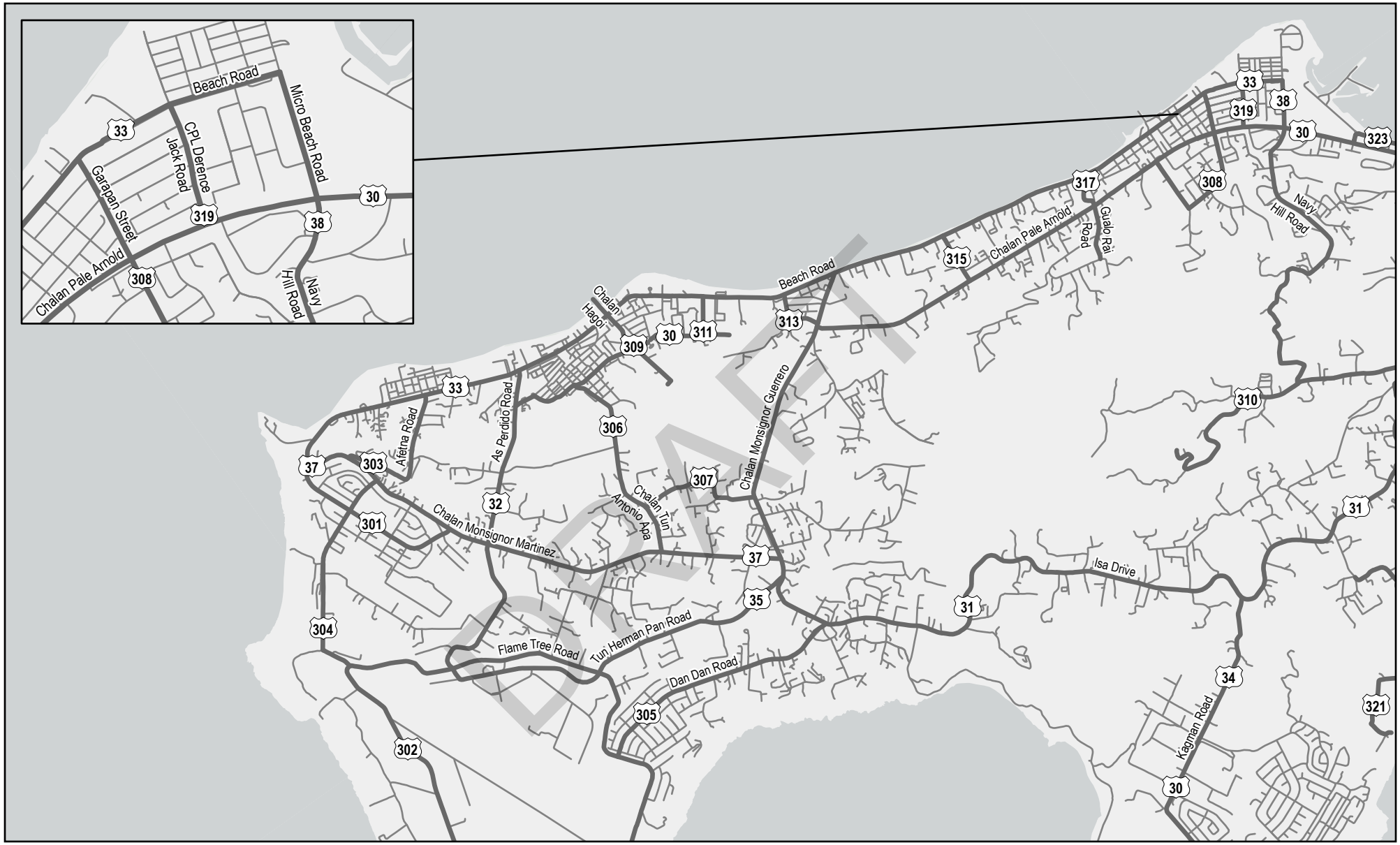
3 Transportation Systems & Volumes

3.1 Existing Roadway Network

This section discusses the existing transportation facilities on the islands of Saipan, Tinian, and Rota, including the highway network on each island that make up the scope of this study. The figures on the following pages present the highway network on Saipan, Tinian, and Rota respectively.

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Legend

- Highways
- Other Roads

Paper Size ANSI A

0 2,250 4,500

US Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

Commonwealth of the Northern Mariana Islands
20 - Year Highway Master Plan

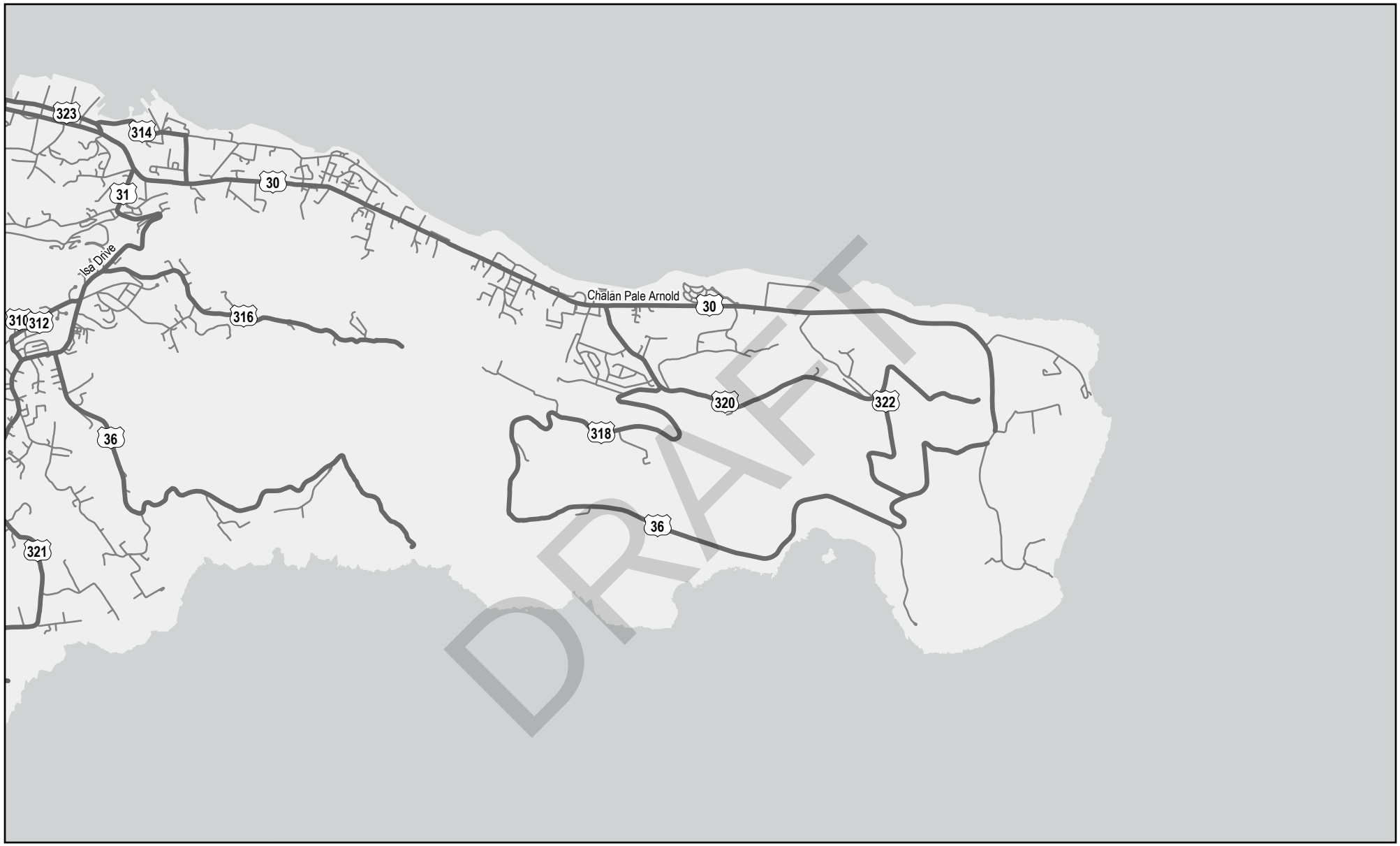
SAIPAN
HIGHWAYS

Project No. **11224010**
Revision No. **-**
Date **Jun 2022**

FIGURE 3-1

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Print date: 29 Jun 2022 - 11:56

Data source: Light Gray Base: BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, METI/NASA, USGS; Highways, Roads: TIGER, 2020. Created by: pthornton



Legend

- Highways
- Other Roads

Paper Size ANSI A

0 2,250 4,500

Feet

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Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

GHD

Commonwealth of the Northern Mariana Islands
20 - Year Highway Master Plan

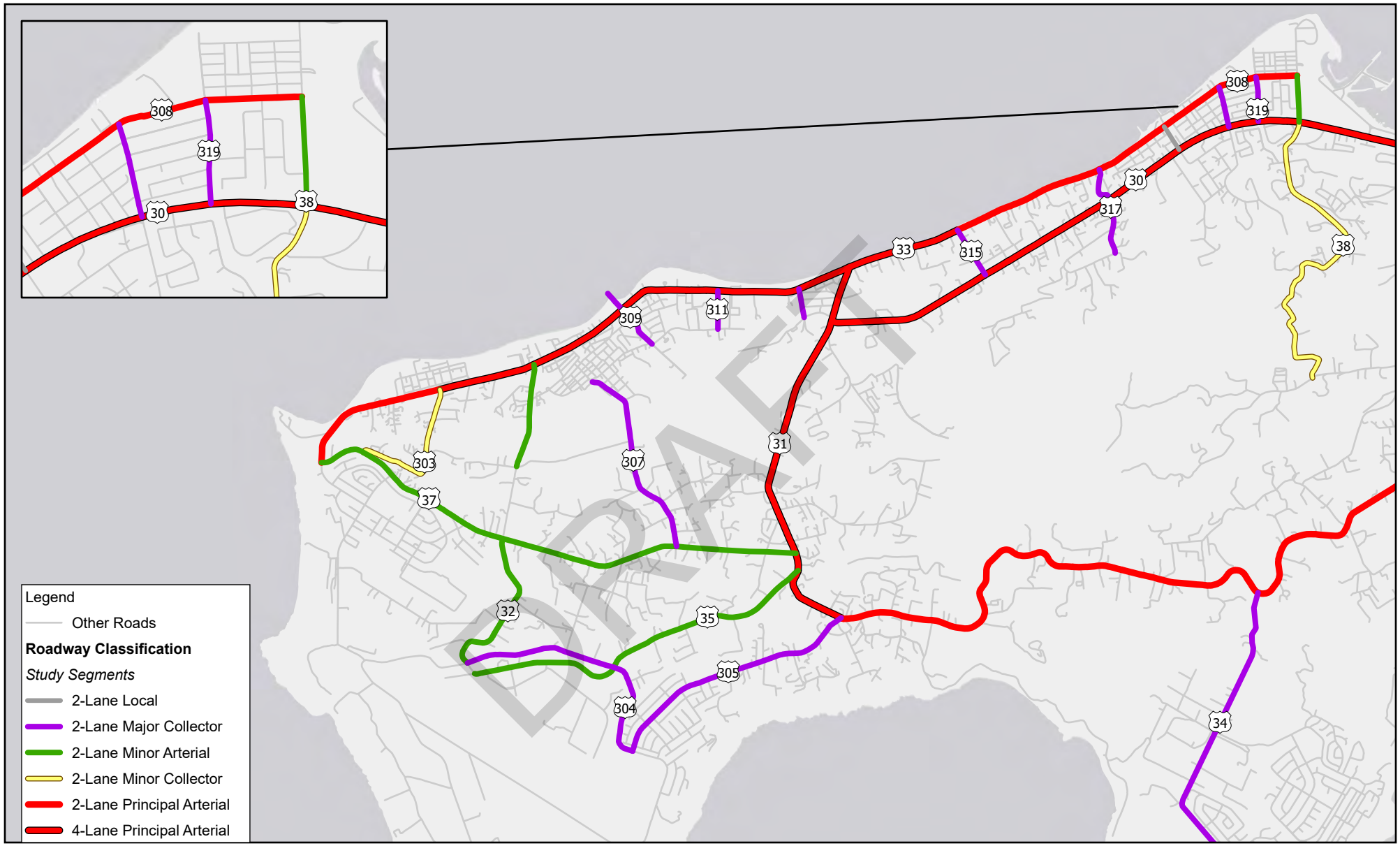
SAIPAN (NORTH) HIGHWAYS

Project No. **11224010**
Revision No. **-**
Date **Jun 2022**

FIGURE 3-2

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_3-2_Island Highways_Saipan_2_North
Print date: 29 Jun 2022 - 11:58

Data source: Light Gray Base: Esri, © OpenStreetMap contributors, HERE, Garmin, METI/NASA, USGS
Light Gray Base: BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, METI/NASA, USGS; Highways, Roads: TIGER, 2020. Created by: pthornton



Paper Size ANSI A

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Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

Commonwealth of the Northern Mariana Islands
20 - Year Highway Master Plan

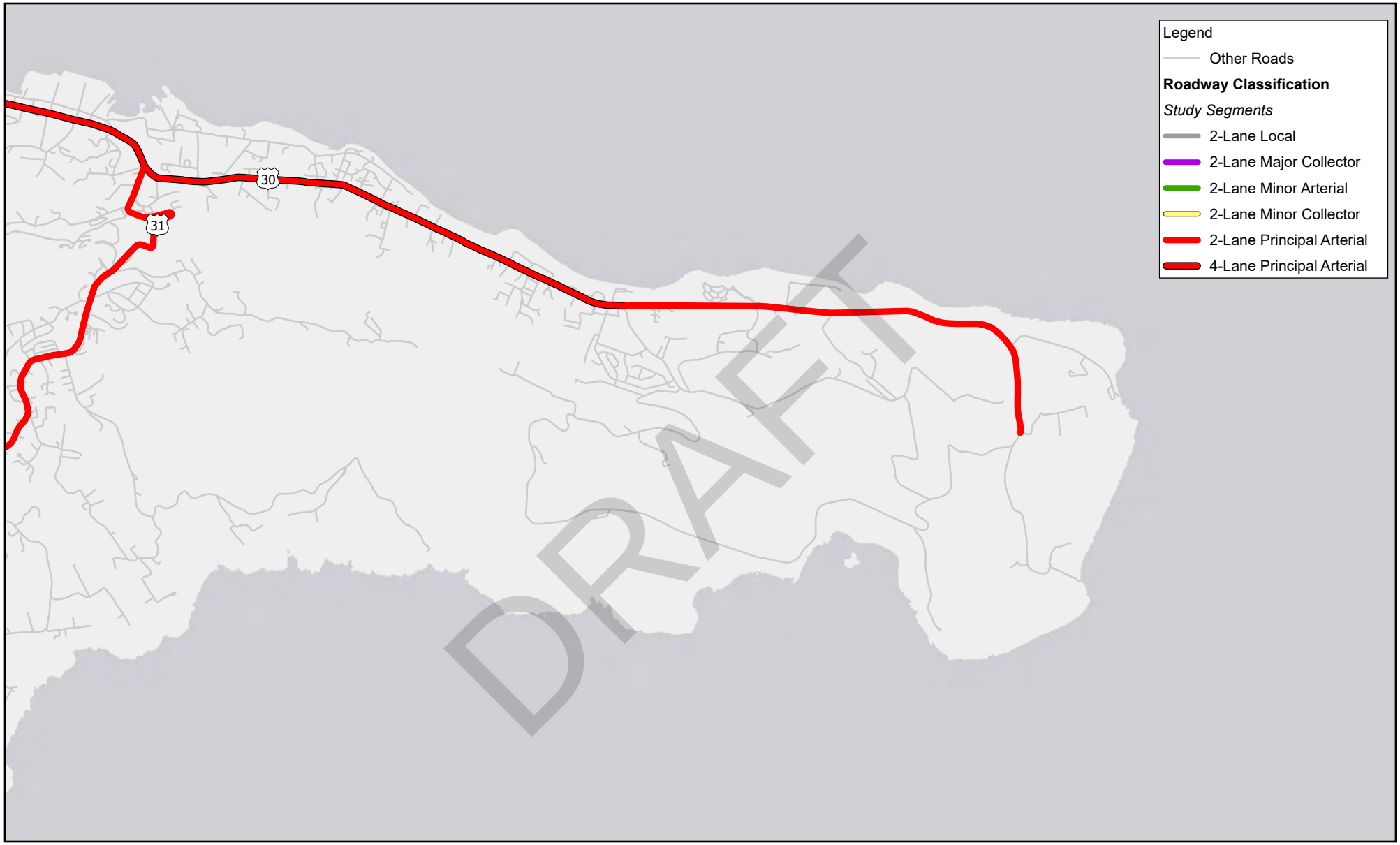
SAIPAN ROADWAY CLASSIFICATIONS

Project No. **11224010**
Revision No. **-**
Date **Jun 2022**

FIGURE 3-3

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_3-3 Roadway Classification_Saipan1
Print date: 29 Jun 2022 - 12:06

Data source: World Light Gray Canvas Base: BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, USGSRoadway Classifications: Caltrans, 2021; Roads: TIGER, 2020. Created by: pthornton



Paper Size ANSI A

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Feet

Map Projection: Transverse Mercator
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Commonwealth of the Northern Mariana Islands
20 - Year Highway Master Plan

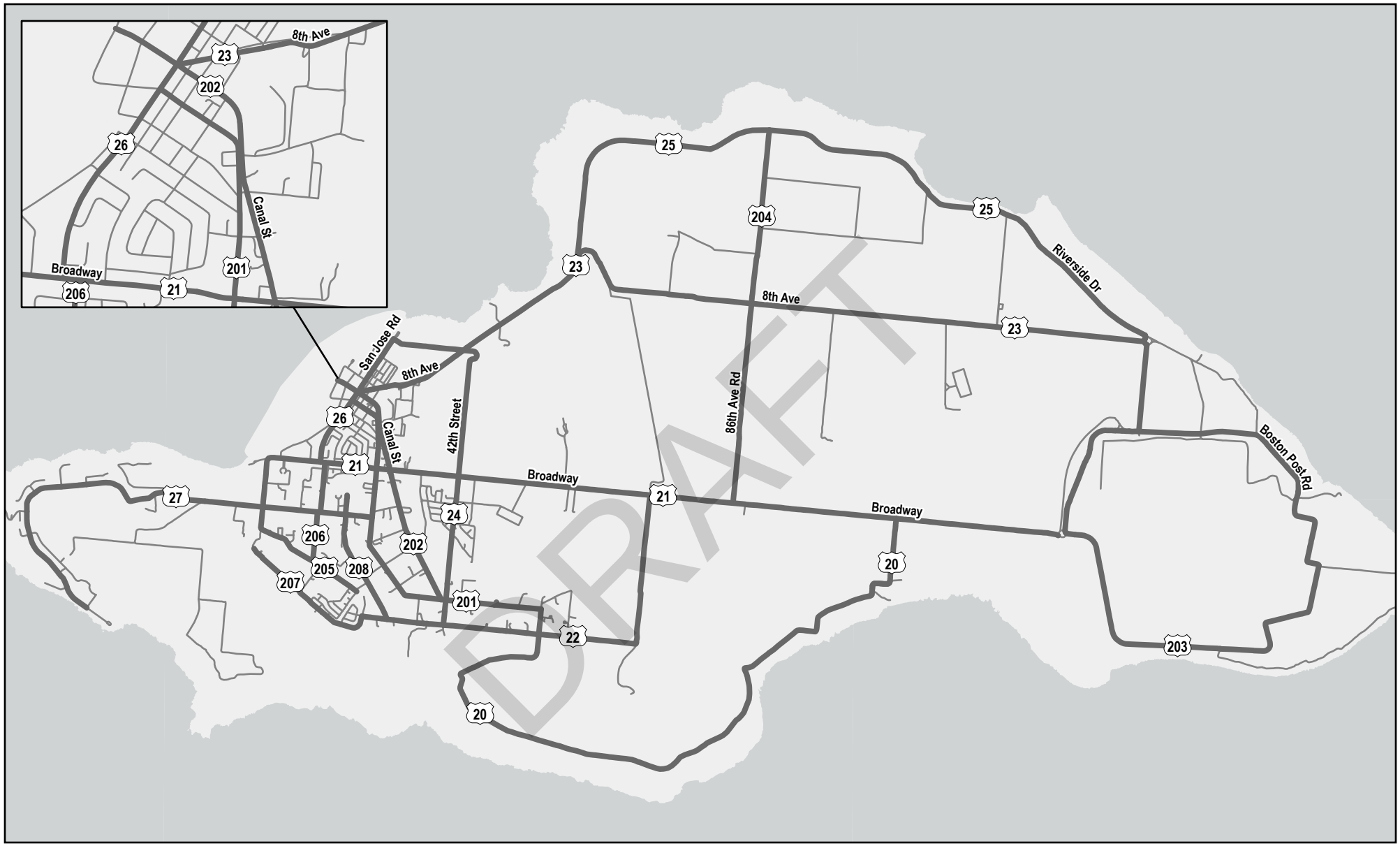
SAIPAN (NORTH) ROADWAY CLASSIFICATIONS

Project No. **11224010**
Revision No. **-**
Date **Jun 2022**

FIGURE 3-4

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Data source: World Light Gray Canvas Base: BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, USGS; Roadway Classifications: Caltrans, 2021; Roads: TIGER, 2020. Created by: pthornton



Legend

- Highways
- Other Roads

Paper Size ANSI A

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Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

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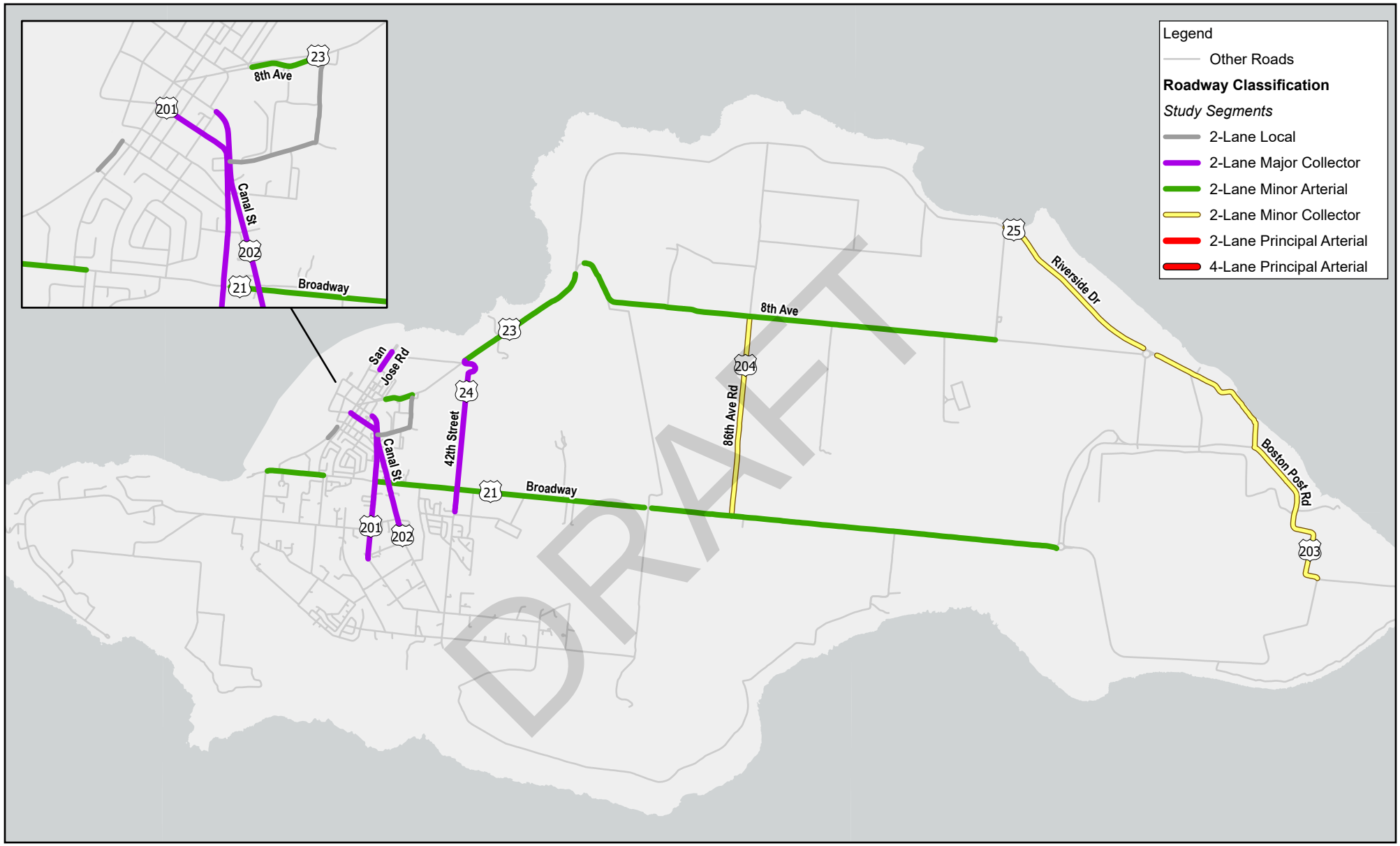
TINIAN
HIGHWAYS

Project No. **11224010**
Revision No. **-**
Date **Jun 2022**

FIGURE 3-5

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_3-5_Island Highways_Tinian
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Data source: Light Gray Base: Esri, © OpenStreetMap contributors, HERE, Garmin, METI/NASA, USGS; Highways, Roads: TIGER, 2020. Created by: pthornton



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US Feet

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20 - Year Highway Master Plan

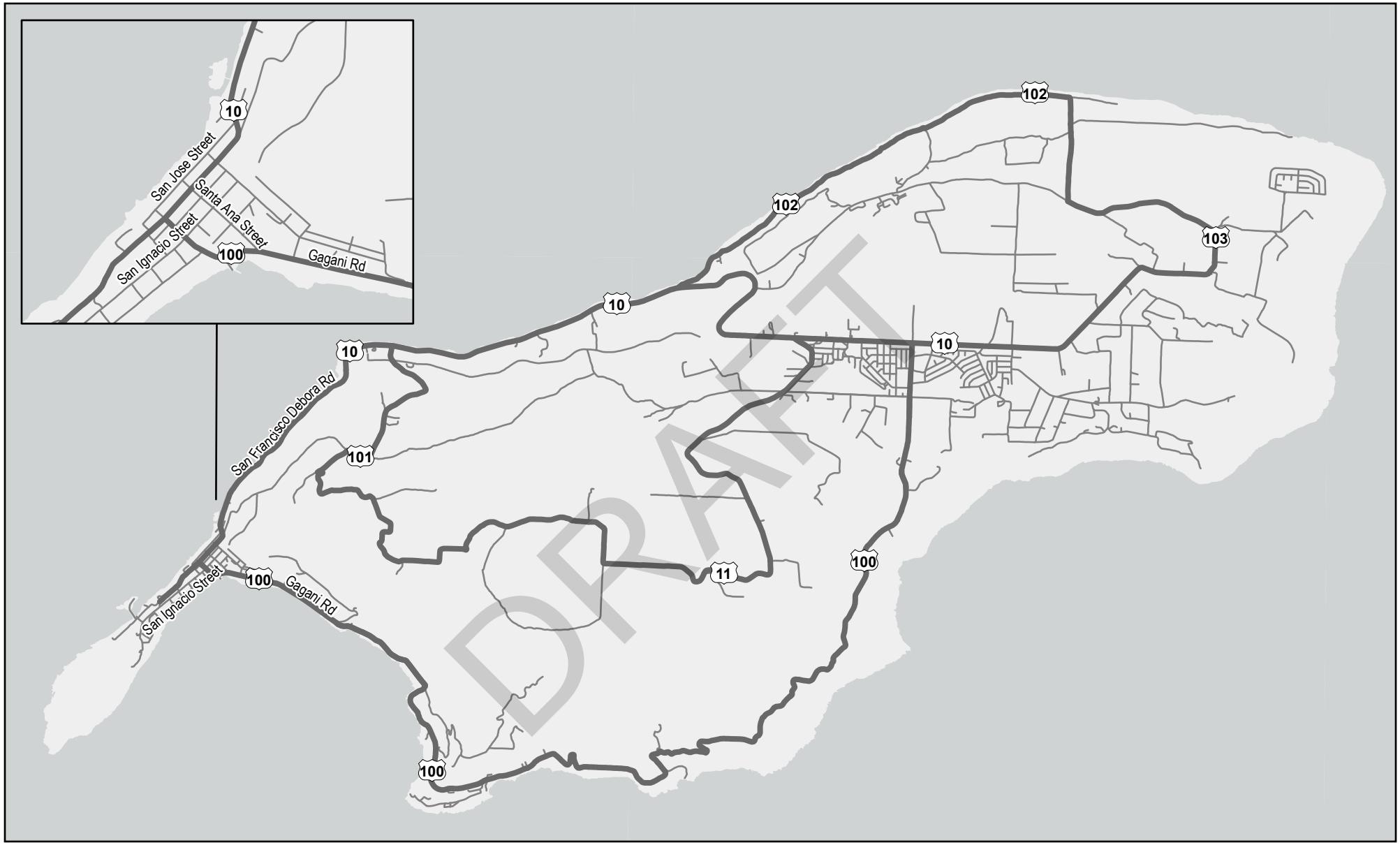
TINIAN ROADWAY CLASSIFICATIONS

Project No. **11224010**
Revision No. **-**
Date **Jun 2022**

FIGURE 3-6

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_3-6_Roadway Classifications_Tinian
Print date: 29 Jun 2022 - 12:21

Data source: Light Gray Base: Esri, © OpenStreetMap contributors, HERE, Garmin, METI/NASA, USGS; Roadway Classifications: Caltrans, 2021; Roads: TIGER, 2020. Created by: pthornton.



Legend

- Highways
- Other Roads

Paper Size ANSI A

0 1,500 3,000 4,500 6,000

US Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

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20 - Year Highway Master Plan

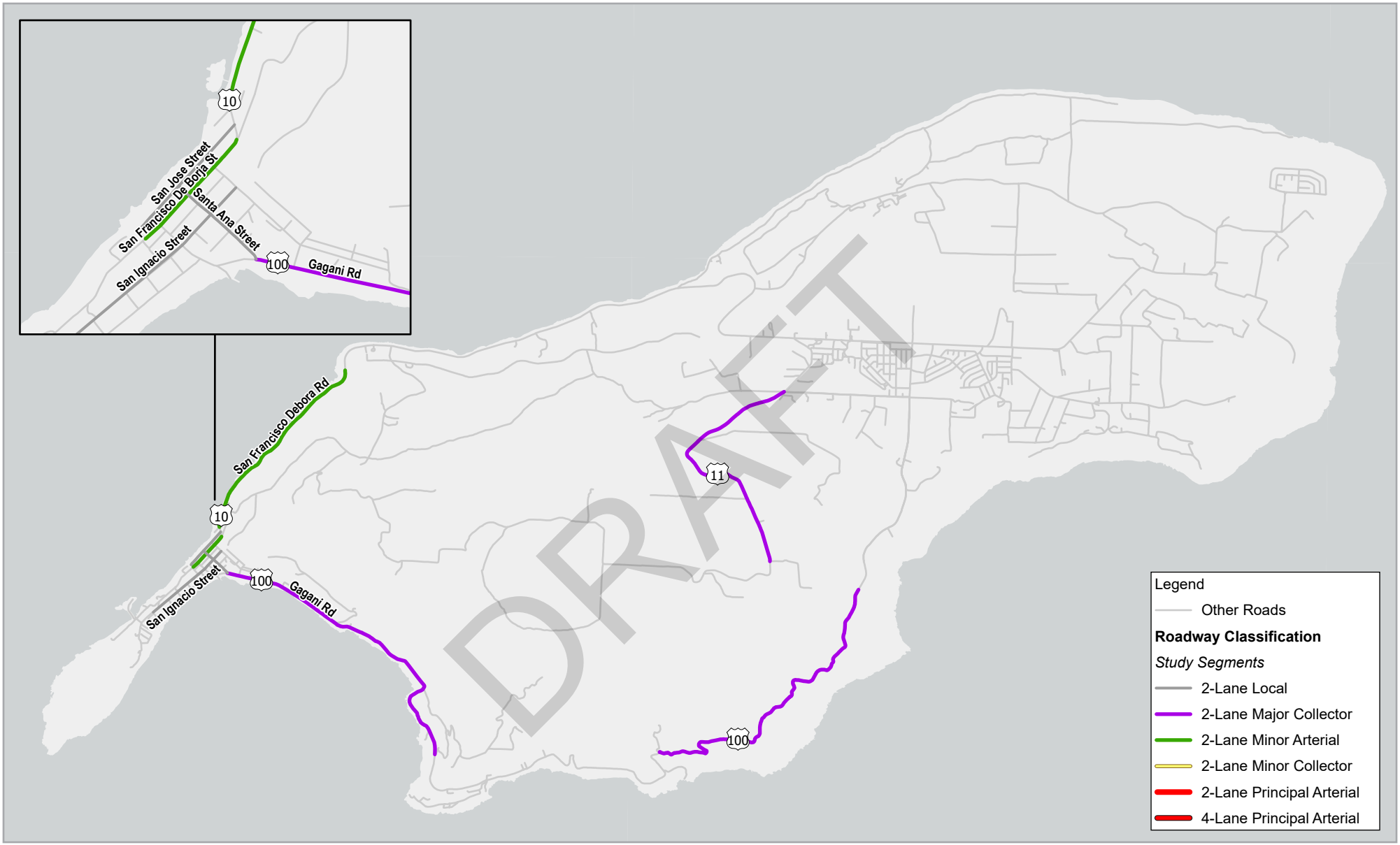
ROTA
HIGHWAYS

Project No. **11224010**
Revision No. **-**
Date **Jun 2022**

FIGURE 3-7

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_3-7_Island Highways_Rota
Print date: 29 Jun 2022 - 13:06

Data source: Light Gray Base: Esri, © OpenStreetMap contributors, HERE, Garmin, SafeGraph, METI/NASA, USGS; Highways, Roads: TIGER, 2020. Created by: pthornton



Paper Size ANSI A

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US Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

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Commonwealth of the Northern Mariana Islands
20 - Year Highway Master Plan

ROTA ROADWAY CLASSIFICATIONS

Project No. **11224010**
Revision No. **-**
Date **Jun 2022**

FIGURE 3-8

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_3-8_Roadway Classifications_Rota
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Data source: Light Gray Base: Esri, © OpenStreetMap contributors, HERE, Garmin, SafeGraph, METI/NASA, USGS; Roadway Classifications: Caltrans, 2021; Roads: TIGER, 2020. Created by: pthornton

3.1.1 Saipan's Existing Roadway Network

Saipan has the largest amount of existing roadway infrastructure among the three islands. There is a network of paved roadways, including multi-lane arterial roadways. Some of the key roadways in the network included in the analysis are Route 33 (Beach Road), Route 30 (Middle Road/Chalan Pale Arnold), Route 31 (Chalan Monsignor Guerrero), Route 35 (Tun Herman Pan Road), Route 31 (Isa Drive), Route 37 (Chalan Monsignor Martinez), and Route 32 (As Perdido Road).

Route 33 (Beach Road)

Route 33 (Beach Road) functionally begins at the road of Micro Beach in Garapan and continues south to Koblerville Road in the southern part of the island (Koblerville). The entire roadway segment is approximately 7 miles long. It is defined as a primary roadway serving as a north-south connection along the westerly coast line of the island.

Beach Road is a two-lane roadway between Micro Beach Road and Quartermaster Road, and it widens to a four-lane roadway south from there to Alu Drive. It then narrows to two lanes and a two-way left turn lane south of Alu Drive. The segment between Micro Beach Road and Garapan Street features a raised median to restrict some left-turn movements in and out of Beach Road. A signalized pedestrian crosswalk is provided adjacent to the Joeten Hafa Adai Shopping Center located south of Route 319. Additionally, some pedestrian crosswalks along the corridor are accompanied by pedestrian-actuated flashing beacons. These facilities help improve the safety for both vehicle and pedestrian access along Beach Road. Sidewalks are provided on both sides of Beach Road between Micro Beach Road and Garapan Street (Route 308). Few sidewalks are provided on Beach Road south of Garapan Street. Table 3.1 summarizes the roadway segments on Beach Road and major characteristics for each roadway segment. While side streets and driveways are generally stop-sign controlled along Beach Road, there are six signalized intersections along the corridor. They are located at Garapan Street, Route 31 (Chalan Monsignor Guerrero) (Route 31), Sarawi Boulevard, Insatto Street, Route 309, and As Perdido (Route 32).

Completed Roadway Improvements

– Traffic signal installation completed at the intersection of Beach Road & Tun Segundo Street

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Table 3.1 Route 33 (Beach Road) Segments

Segment	Segment Location	Lanes	Characteristics
S-1	Micro Beach Road (Route 38) to Garapan Street (Route 308)	2	- Raised-median with left-turn pocket at major intersections and driveways - On-street parking on both sides of street - Sidewalk on both sides of road - Pedestrian signal near the DFS Store - High pedestrian activities - Mainly Commercial and Retail business
S-2	Garapan Street (Route 308) to Route 317 (Gualo Rai Road)	2	- Undivided with two-way left-turn (TWLT) lane - Mainly commercial and retail business
S-3	Route 317 (Gualo Rai Road) to Route 315 (Quartermaster Road)	2	- No raised- or striped-median - SB left-turn pocket provided at Quartermaster Road - Low-density commercial business
S-4	Route 315 (Quartermaster Road) to Chalan Monsignor Guerrero (Route 31)	4	- No raised median or striped median - No turn lanes for unsignalized intersections - Residential and commercial retails on east-side of road
S-5	Chalan Monsignor Guerrero (Route 31) to Chalan Hagoi (Route 309)	4	- No raised- or striped-median - Exclusive left-turn lanes provided at major intersections
S-6	Chalan Hagoi (Route 309) to Route 32 (As Perdido Road)	4	- No raised median or striped median - No turn lanes for unsignalized intersections - Residential and commercials retails fronting the roadway - High pedestrian activities in the vicinity of the Grand and Diamond Hotel
S-7	Route 32 (As Perdido Road) to Afetna Road (Route 303)	2	- Undivided with two-way left-turn (TWLT) lane - Mixed development on sides of road - Faded pavement delineations
S-8	Afetna Road (Route 303) to As Gonno Road (Route 304)	2	- Undivided with two-way left-turn (TWLT) lane - Mixed development on sides of road

Route 30 (Middle Road/Chalan Pale Arnold)

Route 30 (Middle Road/Chalan Pale Arnold), also known as Middle Road/Chalan Pale Arnold, extends from its northern terminus off of As Matius Road (Route 320), loops around the northern tip of the island (partially unpaved up to Bird Island Observatory), and continues south along the western coast to its southern terminus at Route 31 (Chalan Monsignor Guerrero) in San Jose. The entire roadway is approximately 18 miles long and serves as a major north/south route across Saipan. Middle Road/Chalan Pale Arnold is classified as major arterial road south of As Matius Road. North of As Matius Road, Middle Road/Chalan Pale Arnold is classified as a collector road.

Middle Road/Chalan Pale Arnold is a two-lane undivided roadway north of Route 320 (western connection), Route 31 (northern connection), and the rest of the corridor to the south of Route 320 is a four-lane roadway with medians separating oncoming traffic on some portions.

There are eight signalized intersections along Middle Road/Chalan Pale Arnold. They are located at Lower Base Road (Route 314), Isa Drive (Route 31), Smiling Cove Road, Micro Beach Road (Route 38), Garapan Street/Sugar King Road (Route 308), Route 317 (Gualo Rai Road), Quartermaster Road (Route 315), and Route 31 (Chalan Monsignor Guerrero) (Route 31).

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High-visibility pedestrian crosswalks are provided at multiple locations (signalized and unsignalized) along Middle Road/Chalan Pale Arnold. These crosswalk facilities provide safer pedestrian access in the hotel and resort areas and urbanized commercial areas.

Table 3.2 Route 30 (Middle Road/Chalan Pale Arnold) Segments

Segment	Segment Location	Lanes	Characteristics
S-9	North of As Matius Road (Route 320)	2	- Undivided - Rural, with a few fronting hotel resort areas
S-10	As Matius Road (Route 320) to Route 31 (Isa Drive)	4	- Mostly undivided - Left-turn pockets and unsignalized crosswalks provided at major access locations - Fronted by low-density residential, industrial, and hotel resorts
S-11	Route 31 (Isa Drive) to Smiling Cove Road	4	- Mostly undivided, striped-median on some major intersection approaches - Left turn pockets provided at Isa Drive and Smiling Cove Road - Fronted by industrial land uses on the west side of the road
S-12	Smiling Cove Road to Route 317 (Gualo Rai Road)	4	- Undivided - Exclusive turn lanes and crosswalks provided at signalized intersections - Fronted mainly by commercial and retail land uses - Characterized by high pedestrian activity
S-13	Route 317 (Gualo Rai Road) to Quartermaster Road (Route 315)	4	- Undivided - Exclusive turn lanes and crosswalks provided at signalized intersections - Fronted mainly by commercial and retail land uses
S-14	Route 315 (Quartermaster Road) to Chalan Monsignor Guerrero (Route 31)	4	- Undivided - Exclusive turn lanes and crosswalks provided at signalized intersections - Fronted by commercial land uses, with driveways connecting to low-density residential areas

Route 31 (Chalan Monsignor Guerrero)

Chalan Monsignor Guerrero is an east-west street providing a connection between Beach Road in the west and Isa Drive in the eaStreet The entire roadway is approximately 2.5 miles long. According to the existing roadway classification, Chalan Monsignor Guerrero is a 4-lane principal arterial. Table 3.3 summarizes the characteristics of the study roadway segments on Chalan Monsignor Guerrero.

The intersections at Beach Road, Middle Road/Chalan Pale Arnold, Chalan Tun Antonio, Chalan Monsignor Martinez, Tun Herman Pan Road, and Isa Drive / Route 305 (DanDan Road) are signalized. At each of these intersections, exclusive turn lanes are provided for most turning movements.

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Table 3.3 Route 31 (Chalan Monsignor Guerrero) Segments

Segment	Segment Location	Lanes	Characteristics
S-15	Route 33 (Beach Road) to Route 30 (Middle Road/Chalan Pale Arnold)	4	- Undivided, with striped medium - Turn lanes provided at intersections of Beach Road and Middle Road/Chalan Pale Arnold - Fronted by commercial and retail land uses
S-16	Route 30 (Middle Road/Chalan Pale Arnold) to Route 35 (Tun Herman Pan Road)	4	- Undivided - No turn lanes provided at unsignalized intersections - Fronted by low-density residential and mixed use developments
S-17	Route 35 (Tun Herman Pan Road) to Route 31 (Isa Drive) / Route 305 (DanDan Road)	4	- Undivided, with medians on some intersection approaches - No turn lanes provided at unsignalized intersections - Fronted by residential land uses

Route 35 (Run Herman Pan Road)

Route 35 (Tun Herman Pan Road) is a north-south road extends from Saipan International Airport to Chalan Monsignor Guerrero. The entire roadway is approximately 2.5 miles long and is classified as a 2-lane minor arterial roadway. Roadway characteristics for the study segments on Tun Herman Pan Road are summarized in Table 3.4.

Table 3.4 Route 35 (Tun Herman Pan Road) Segments

Segment	Segment Location	Lanes	Characteristics
S-18	Route 31 (Chalan Monsignor Guerrero) to Route 304 (Flame Tree Road)	2	- Undivided - Fronted by low density residential land uses
S-19	Route 304 (Flame Tree Road) to As Gonno Road	2	- Undivided - Airport access

Route 31 (Isa Drive)

Route 31 (Isa Drive) extends from Tun Herman Pan Road to Middle Road/Chalan Pale Arnold, providing access to several villages in the eastern portion of Saipan. The roadway is approximately 7.6 miles long and is classified as 2-lane principal arterial roadway. Roadway characteristics for study segments on Isa Drive are summarized in Table 3.5.

Isa Drive is an undivided two-lane road traversing mountainous terrain. In certain areas, the roadway alignment is especially winding with tight turns. Traffic signals are present at the intersections of Tun Herman Pan Road, DanDan Road, and Middle Road/Chalan Pale Arnold. Exclusive turn lanes are provided at these locations for all turning movements.

Table 3.5 Route 31 (Isa Drive) Segments

Segment	Segment Location	Lanes	Characteristics
S-20	Route 30 (Middle Road/Chalan Pale Arnold) to Capital Hill Road (Route 312)	2	- Undivided
S-21	Capital Hill Road (Route 312) to Route 305 (DanDan Road)	2	- Undivided

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Completed Roadway Improvements

– Vehicle turnout installed at Isa Drive & Capital Hill Road
– Improved signage implemented along Isa Drive near Kagman Road

Route 305 (DanDan Road)

Route 305 (DanDan Road) extends from Route 304 (Flame Tree Road) north through Dandan Village to Route 31 (Isa Drive) spanning approximately 1.7 miles. DanDan Road is an undivided two-lane road. A traffic signal is located at its northern terminus where it intersects Isa Drive as the minor road. At the southern terminus, DanDan Road intersects at Flame tree Road at an uncontrolled intersection. Along its length, DanDan Road is accessed by local roads and driveways of fronting residential properties. Roadway characteristics for the study segment on DanDan Road are summarized in Table 3.6.

Table 3.6 Route 305 (DanDan Road) Segments

Segment	Segment Location	Lanes	Characteristics
S-22	Route 31 (Chalan Monsignor Guerrero) to Route 304 (Flame Tree Road)	2	- Undivided, unstriped

Route 304 (Flame Tree Road)

Route 304 (Flame Tree Road) extends northwest from its eastern terminus at Naftan Road (Roue 302), makes up the southern limit of Dandan Village, and continues southwest past Saipan International Airport. At its western terminus, Flame Tree Road forms a three-legged intersection with Naftan Road and As Gonno Road. Flame Tree Road continues west beyond this intersection by way of As Gonno Road.

The majority of Flame Tree Road has centerline stripe dividing the two directions of travel, including the study segments summarized in Table 3.7. The intersection of Flame Tree Road and As Perdidio Road (Route 35) is all-way stop-controlled (AWSC). Access to other minor roads along Flame Tree Road is either uncontrolled or side-street stop-controlled (SSSC) also known as two-way stop-controlled (TWSC).

Table 3.7 Route 304 (Flame Tree Road) Segments

Segment	Segment Location	Lanes	Characteristics
S-23	Route 305 (DanDan Road) to Tun Herman Pan Rd (Route 35)	2	- Undivided - Centerline stripe on a portion of the segment
S-24	Tun Herman Pan Road (Route 35) to Route 32 (As Perdido Road)	2	- Undivided

Route 37 (Chalan Monsignor Martinez)

Route 37 (Chalan Monsignor Martinez) extends from its southern terminus at Beach Road to Chalan Monsignor Guerrero (Route 31), spanning approximately 3.3 miles. Chalan Monsignor Martinez is a two-lane road with centerline markings along its entire length. Chalan Tun Joaquin Doi connects to Chalan Monsignor Martinez at an uncontrolled intersection. Roadway characteristics for the study segments on Isa Drive are summarized in Table 3.8.

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Table 3.8 Route 37 (Chalan Monsignor Martinez) Segments

Segment	Segment Location	Lanes	Characteristics
S-25	Route 31 (Chalan Monsignor Guerrero) to Chalan Tun Joaquin Doi	2	- Undivided
S-26	Chalan Tun Joaquin Doi to Beach Road	2	- Undivided

Route 32 (As Perdido Road)

Route 32 (As Perdido Road) is a two-lane undivided roadway which provides east-west mobility between Beach Road and the Saipan International Airport. It is classified as a minor arterial roadway. The entire roadway is approximately 2.2 miles long. There are two signalized intersections along As Perdido Road, located at Beach Road and Chalan Monsignor Martinez. Roadway characteristics for the study segments on As Perdido Road are summarized in Table 3.9.

Table 3.9 Route 32 (As Perdido Road) Segments

Segment	Segment Location	Lanes	Characteristics
S-27	Route 33 (Beach Road) to Route 37 (Chalan Monsignor Martinez)	2	- Undivided - Fronted by low density residential and light industrial
S-28	Route 37 (Chalan Monsignor Martinez) to Tun Herman Pan Road	2	- Undivided - Fronted by scattered residential and other developments

Completed Roadway Improvements

– Improved signage implemented along Route 32 (As Perdido Road)

Other Roadway Segments

In addition to the roadway segments presented above, the remaining study segments are listed in Table 3.10.

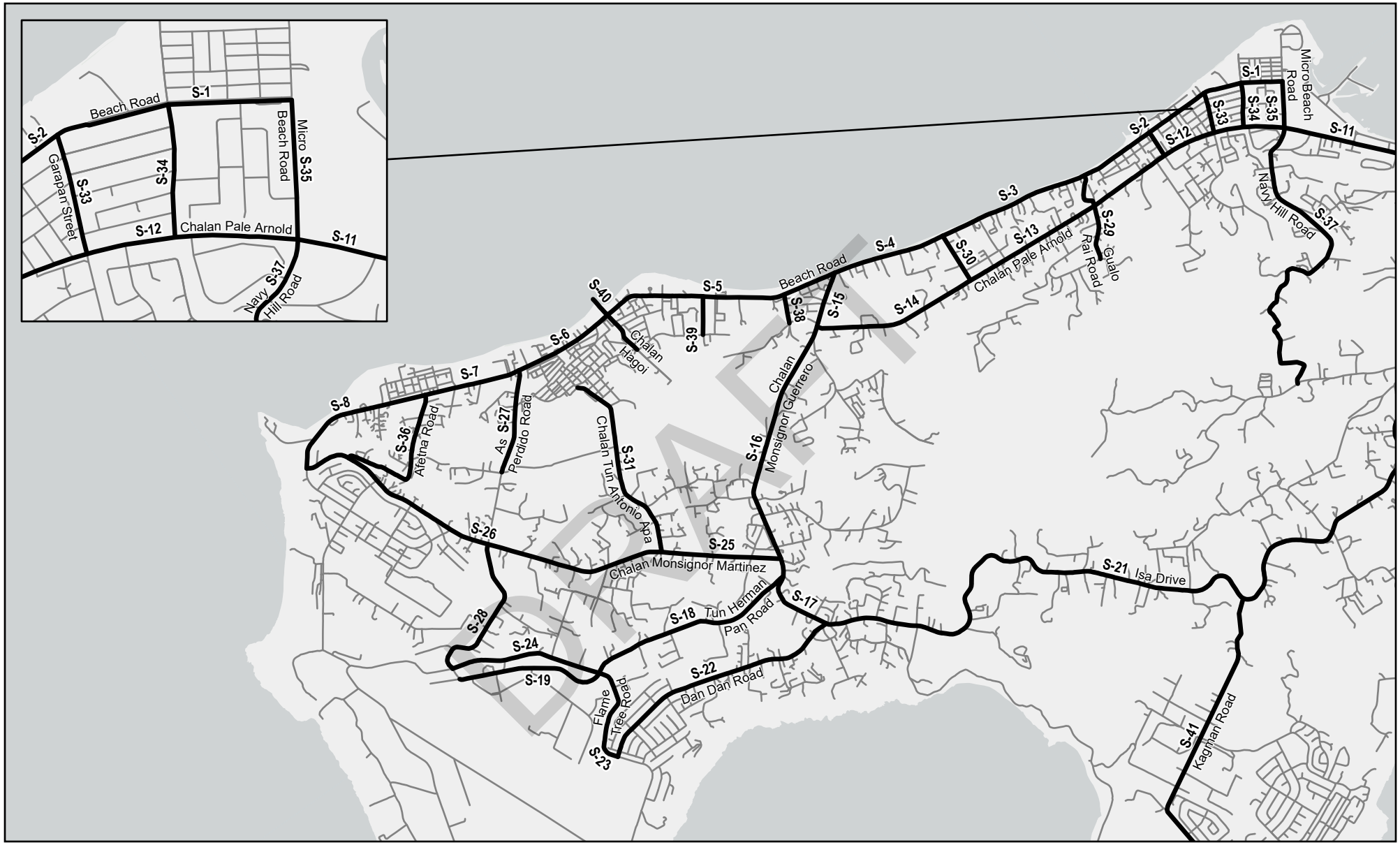
Table 3.10 Other Study Roadway Segments

Segment	Segment Location	Lanes	Characteristics
S-30	Route 315 (Quartermaster Road)	2	- Undivided
S-31	Chalan Tun Joaquin Doi	2	- Undivided
S-32	Ropa Di Oru Street	2	- Undivided
S-33	Garapan St	2	- Undivided
S-34	CPL Deference Jack Road	2	- Undivided
S-35	Route 38 (Micro Beach Road)	2	- Undivided
S-36	Afetna Road	2	- Undivided
S-37	Navy Hill	2	- Undivided
S-38	Oleai Street	2	- Undivided
S-39	Tekken Street	2	- Undivided
S-40	Chalan Hagoi	2	- Undivided
S-41	Kagman Road	2	- Undivided

The figure on the following pages provides a map of study roadway segments on the island of Saipan.

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Legend

- Roadway Study Segments
- Other Roads

Paper Size ANSI A

0 2,250 4,500

Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

Commonwealth of the Northern Mariana Islands
20 - Year Highway Master Plan

ROADWAY STUDY SEGMENTS - SAIPAN

Project No. **11224010**
Revision No. **-**
Date **Jun 2022**

FIGURE 3-9

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Print date: 29 Jun 2022 - 13:32

Data source: Light Gray Base: BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, METI/NASA, USGS
Light Gray Base: Esri Community Maps Contributors, BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, METI/NASA, USGS; Roads: TIGER, 2020. Created by: pthornton



Legend

- Other Roads
- Roadway Study Segments

Paper Size ANSI A

0 2,250 4,500

Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

Commonwealth of the Northern Mariana Islands
20 - Year Highway Master Plan

ROADWAY STUDY SEGMENTS - SAIPAN (NORTH)

Project No. **11224010**
Revision No. **-**
Date **Jun 2022**

FIGURE 3-10

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Print date: 29 Jun 2022 - 13:33

Data source: Light Gray Base: Esri Community Maps Contributors, Esri, © OpenStreetMap contributors, HERE, Garmin, METI/NASA, USGS
Light Gray Base: BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, METI/NASA, USGS; Roadways: TIGER, 2020. Created by: pthornton

3.1.2 Tinian's Existing Roadway Network

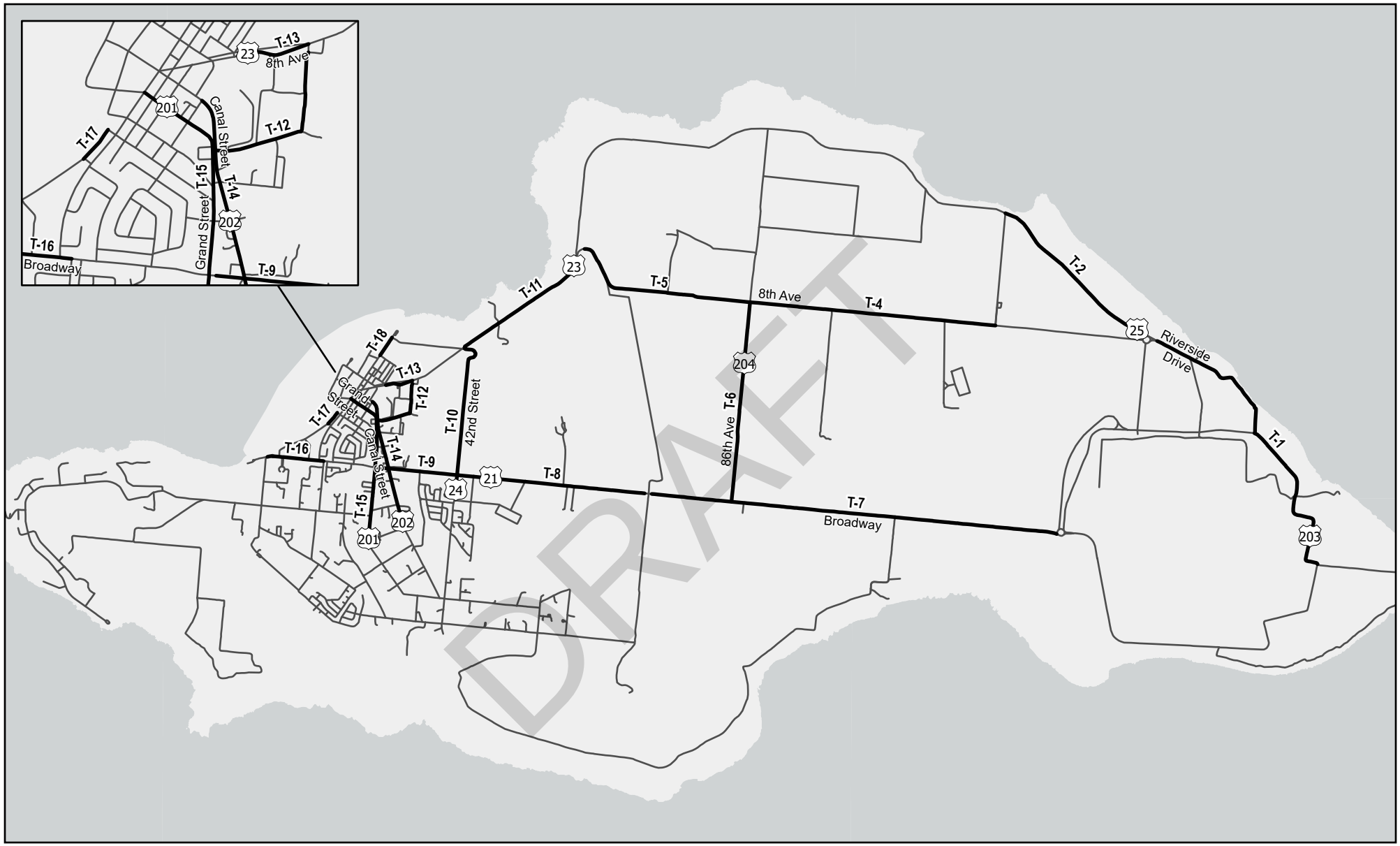
Study roadway segments on the island of Tinian are listed in Table 3.11 and mapped in the figure on the following page.

Table 3.11 Tinian Study Roadway Segments

Segment ID	Segment Location	# of Lanes	Characteristics
T-1	Riverside Drive, east of 8th Street	2	- Undivided
T-2	Riverside Drive, west of 8th Street	2	- Undivided
T-3			-
T-4	8th Street, north of 86th Street	2	- Undivided
T-5	8th Street, south of 86th Street	2	- Undivided
T-6	86th Ave, 8th Street to Broadway	2	- Undivided
T-7	Broadway, north of 86th Street	2	- Undivided
T-8	Broadway, north of 42nd Street	2	- Undivided
T-9	Broadway, 42nd Street to Rte 201	2	- Undivided
T-10	42nd Street, west of Broadway	2	- Undivided
T-11	8th Street, north of 42nd Street to Riverside Dr	2	- Undivided
T-12	No Name (School Road), Rte 202 to 8th Street	2	- Undivided
T-13	8th Street, north of Canal Street	2	- Undivided
T-14	Canal Street, west of Broadway	2	- Undivided
T-15	Route 201, west of Broadway	2	- Undivided
T-16	Broadway, south end / north of Wall Street	2	- Undivided
T-17	No name, at Bus Stop / south of Kammer Beach	2	- Undivided
T-18	No Name, road north of Breakwater Park	2	- Undivided

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Legend

- Other Roads
- Roadway Study Segments

Paper Size ANSI A

0 1,500 3,000 4,500 6,000

US Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

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ROADWAY STUDY SEGMENTS - TINIAN

Project No. **11224010**
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FIGURE 3-11

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Print date: 29 Jun 2022 - 13:40

Data source: Light Gray Base: Esri, © OpenStreetMap contributors, HERE, Garmin, METI/NASA, USGS; Roads: TIGER, 2020. Created by: pthornton

3.1.3 Rota's Existing Roadway Network

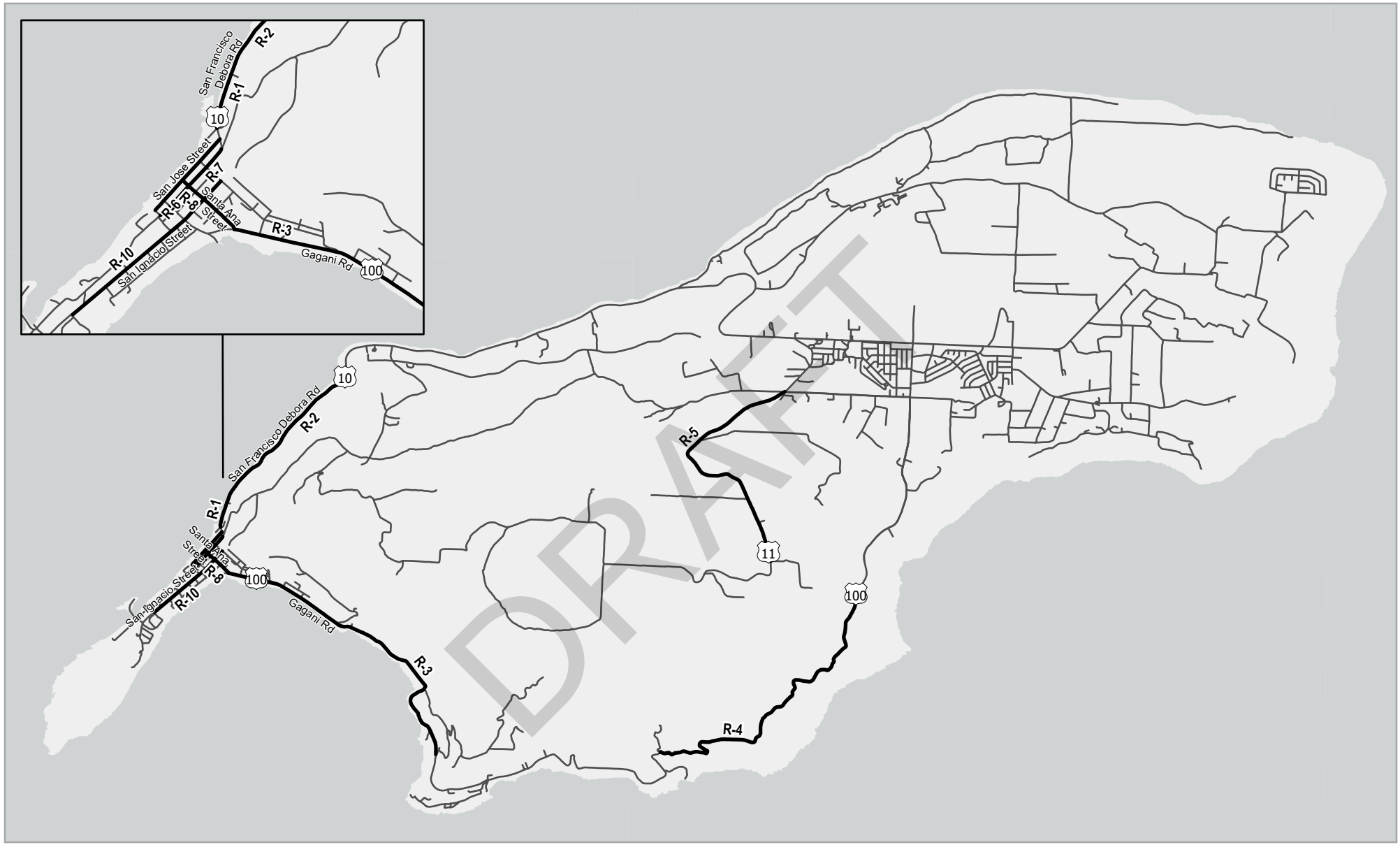
Study roadway segments on the island of Rota are listed in Table 3.12 and mapped in the figure on the following page.

Table 3.12 Rota Study Roadway Segments

Segment ID	Segment Location	# of Lanes	Characteristics
R-1	Route 10, south of Route 101	2	- Undivided
R-2	Route 10, north of Route 101	2	- Undivided
R-3	Route 100, south of Songsong Village	2	- Undivided
R-4	Route 100, along southeastern coast	2	- Undivided
R-5	Route 11	2	- Undivided
R-6	San Jose Street, south of Rte 10	2	- Undivided
R-7	San Francisco De Borja St, south of Rte 10	2	- Undivided
R-8	Santa Ana Street, San Jose St to Rte 100	2	- Undivided
R-9	San Ignacio Street, north of Santa Ana Street	2	- Undivided
R-10	San Ignacio Street, south of Santa Ana Street	2	- Undivided

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Legend

- Other Roads
- Roadway Study Segments

Paper Size ANSI A

0 1,500 3,000 4,500 6,000

US Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

N

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Commonwealth of the Northern Mariana Islands
20 - Year Highway Master Plan

ROADWAY STUDY SEGMENTS - ROTA

Project No. **11224010**
Revision No. **-**
Date **Jun 2022**

FIGURE 3-12

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Data source: Light Gray Base: Esri, © OpenStreetMap contributors, HERE, Garmin, SafeGraph, METI/NASA, USGS; Highways, Roads: TIGER, 2020. Created by: pthornton

3.2 Existing Pavement Conditions

In 2018, Typhoon Yutu passed over CNMI, causing damage and sediment buildup on transportation infrastructure. Issues with roadway surfaces, such as potholes, occasional flooding, and lack of paved shoulders have been identified as potential hazards. The Department of Public Works Technical Services Division's 4-Year Transportation Improvement Plan listed several resurfacing treatments to be implemented between fiscal years 2017-2020. Photos documenting existing pavement conditions on Saipan are provided on the following page, including examples of roadways without pavement or with poor pavement conditions.

Photo 3-1 Intersection at Route 38 (Micro Beach Road) & Route 30 (Middle Road/Chalan Pale Arnold)



Photo 3-2 Unpaved Roadway near Peace Park



Photo 3-3 Unpaved Surface in Industrial Port Area (Route 323)



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3.3 Existing Multimodal Facilities

Saipan

Sidewalk facilities are mainly located within the developed commercial center of Garapan and fronting Route 30 at the location of Marianas High School. Automobile travel remains the primary mode of travel supported by infrastucture between developed areas. Photos documenting existing conditions of multimodal infrastrucutre on Saiapan are provided on the following page.

Roadway audits were performed as part of the data-gathering process for the *2021 Availability of Street-Level Supports for Walking in Saipan*. Under these audits, the following observations were recorded:

> *When safety factors were assessed, it was found that 17.5% of segments had no streetlights, 24.3% had stray dogs present during the audit, and 72.3% had no sidewalks. Of the segments with sidewalks, 78.3% had no buffer between the sidewalk and the road. Of the segments without a sidewalk, 30.7% had no other roadside space to walk. Commercial segments had a higher prevalence of no streetlights compared to residential segments (19.2% vs 12.0%, $p<0.05$). In addition, residential segments had a significantly higher prevalence of stray dogs present compared to commercial segments (42.0% vs 18.6%, $p<0.05$).*
>
> *When physical disorder was assessed, it was found that 41.8% of sidewalks had major trip hazards, such as misalignment, overgrowth, cracks, or an incomplete sidewalk. 46.8% of segments had abandoned buildings or overgrown vacant lots and 18.9% were considered to have some or a lot of litter, as opposed to none or very little.*
>
> *When functional design was assessed, it was found that 12.6% of segments had access to a park, 24.3% had public transportation access, 18.0% had places to sit, 1.5% had adequate sun coverage, and 1.0% had a designated bike lane.*
>
> *When crossings were assessed, it was found that 60.0% had no walk signal present, 54.0% had no pedestrian signs present, and 80.0% had no marked crosswalk on the road. Of the crosswalks that were marked, 67.4% were worn or faded to the point they are difficult to see.*
>
> *The overall walkability score of all street segments evaluated on Saipan was 6.57 (95% CI: 6.25, 6.88) out of 20 possible points. Commercial areas had a higher walkability score (7.10; 95% CI: 6.76, 7.45) than residential areas (4.90; 95% CI: 4.39, 5.41).*

According to this report, the primary infrastructure-related challenges for safe pedestrian travel on Saipan are:

- Lack of adequate and connected pedestrian pathways or sidewalk
- Lack of or incomplete/faded marked cross-walks at intersections
- Limited or inadequate lighting in pedestrian areas
- Presents of major trip hazards, such as misalignment, overgrowth, crasks, or incomplete sidewalk.
- Limited connections to places of interest, such as parkings, public transportation, etc.
- Lack of pedestrian signal phase at signalized intersections
- Lack of pedestrian signage

Tinian

Pedestrian infrastructure on Tinian is composed of sidewalks adjacent to Canal Street and Route 201 in the developed area of the San Jose community. Walking access to the sites of interest along the northern coast of Tinian is limited.

Rota

The developed communities on the island of Rota, Songsong Village and Sinpalu Village, lack dedicated pedestrian infrastructure. The highway routes along the north and south coastlines also lack pedestrian and bike infrastructure, which limits non-motorized accessibility across the island.

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Photo 3-4 Lack of Pedestrian Facilities near a School (Intersection of Route 304 & Route 301)



Photo 3-5 Lack of Pedestrian Pathway or Sidewalk along Route 38 (Micro Beach Road)



Photo 3-6 Missing crosswalk – Intersection of Route 38 & Route 30



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3.4 Public Transit

The Commonwealth Office of Transit Authority (COTA) provides a bus transit service routes on Saipan:

– Route 1A – Flame Tree Line: Travels between Northern Marianas College and Garapan, serving stops along Chalan Monsignor Guerrero and Middle Road/Chalan Pale Arnold.
– Route 1B – Flame Tree Line: Spans Route 37 (Chalan Monsignor Martinez), serving several stops at the southern portion of the island, and continues on Beach Road up to Garapan.
– Route 2: Travels between Garapan and San Roque, serving stops along Middle Road/Chalan Pale Arnold.
– Route 3: Travels between Garapan and Kagman, stopping along Middle Road/Chalan Pale Arnold and Isa Drive.
– Route 4: Travels between Northern Marianas College and Kagman, serving several stops near Saipan International Airport, within the community of Dandan, and along Isa Drive.

The current headway for all routes is 120 minutes.

3.5 Truck Routes, Airports & Goods Movement

Truck Routes

In Saipan, Route 33 (Beach Road) and Route 30 (Middle Road/Chalan Pale Arnold) (Route 30) make up major commercial vehicle routes for the movement of goods between the developed areas along the west coast of the island. Route 31, made up of Chalan Monsignor Guerrero and Isa Drive, provide commercial vehicle access to the developed areas on the Eastern portions of the island, such as Dandan and Kagman. However, the tight turns and pavement conditions on the north portion of Route 31 just south of Route 30 can limit the traversability of the road for tall commercial vehicles. Route 304, made up of As Gonno Road and Route 304 (Flame Tree Road) provide commercial vehicle access between Saipan International Airport and the communities of San Antonio and Dandan in the southern portion of the island.

On Tinian, Broadway and 8th Avenue provide routes for commercial vehicles between the community of San Jose (including port facilities in the southwest) and Tinian International Airport.

Air Travel

Francisco C. Ada/Saipan International Airport (SPN) is the major public airport on the island of Saipan. It serves as a destination for several airlines, currently with international connecting flights to Busan, Hong Kong, Seoul, Beijing, and most frequently, Guam. Short-distance flights also provide service to airports on Tinian and Rota.

Tinian International Airport serves passenger traffic from inter-island travels from Saipan, Rota, and Guam, accommodating single engine aircraft with capacity of up to 9 passengers. The Tinian International Airport is positioned atop a plateau in the central west corner of the island inside the Military Retention Zone (MRZ). Car rental services are available at the airport to accommodate tourists.

Benjamin Taisacan Manglona International Airport of Rota serves passenger traffic from inter-island travels from Saipan and Guam. Rota's International Airport is located in the central east area of the island, near the village of Sinapalu. Current aircraft include an ATR 42 aircraft with capacity of up to thirty passengers as well as eight passenger Navaho aircraft. Car rental services are available at the airport to accommodate tourists.

Ports

The Port of Saipan is located along the north coast just east of the village of Garapan, with connections to Route 30 (Middle Road). The port services freight, tourist cruises, and the US Coast Guard. Tinian Harbor is located along the southwestern coast of Tinian in the village of San Jose. The harbor services a fuel bulk plant operated by Mobil Oil and provides a small boat ramp to local use. Rota Harbor is located is in the Village of Liyu just south of Songsong. The harbor services storage companies, customs and immigration services, and provides docks for personal boats.

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3.6 Current Traffic Data

Daily roadway traffic counts were gathered by the Department of Public Works (DPW) at locations across Saipan, Tinian, and Rota to ensure a varied data set for average daily traffic (ADT) volumes to assess the current vehicular utilization of the roadways. Roadway traffic counts were collected at a variety of locations consistent with previous Highway Master Plan updates in 1997 and 2008. Twenty-six new roadway traffic counts were collected along study facilities in 2021, and traffic counts from 2016 and 2017 were provided for four additional roadway locations. This collection of traffic data, from years 2016 to 2021, represents current travel conditions to inform roadway and intersection operational analysis and assessment and is summarized in Table 3.13

The new 2021 counts were collected during the COVID-19 pandemic, during which time tourism to the islands was restricted. Due the potential effect of the COVID-19 pandemic on vehicular travel volumes, the 2021 ADT volumes were compared to the 2008 ADT volumes to determine the degree of this impact. As shown, the new 2021 ADT volumes were approximately 20.3-percent lower, on average, compared to 2008 ADT volumes. Thus, it is likely that the COVID-19 pandemic had a significant impact on the traffic volumes observed by the 2021 counts.

The figures on the following pages present maps of the current traffic data (from 2016 to 2021) that make up current conditions (collection years are shown in red numbers). 2021 volume estimates for locations where recent traffic counts were not collected were prepared for study locations not shown in the table above. These estimates (shown in black text) were achieved by reducing the available 2008 volumes by the average-percent change of 20.3-percent.

Note on 2008 Traffic Volumes:

It should be noted that 2008 traffic volume data from the prior Highway Master Plan did not collect new traffic count information at all study locations. Most of the 2008 traffic volumes were estimated based on 1997 data, and grown based on historical traffic trends in the decades prior to 1997. As documented in population, tourism, and employment trends, this may have had the result of overestimating 2008 counts in several locations.

While the 20.3-percent average reduction in travel between 2008 and 2021 appears reasonable relative to recent demographic, tourism, and economic trends, some of the larger percent changes shown below may reflect an overestimation of 2008 traffic volumes.

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Table 3.13 Updated Current Count Locations, Comparison to 2008 Study Volumes

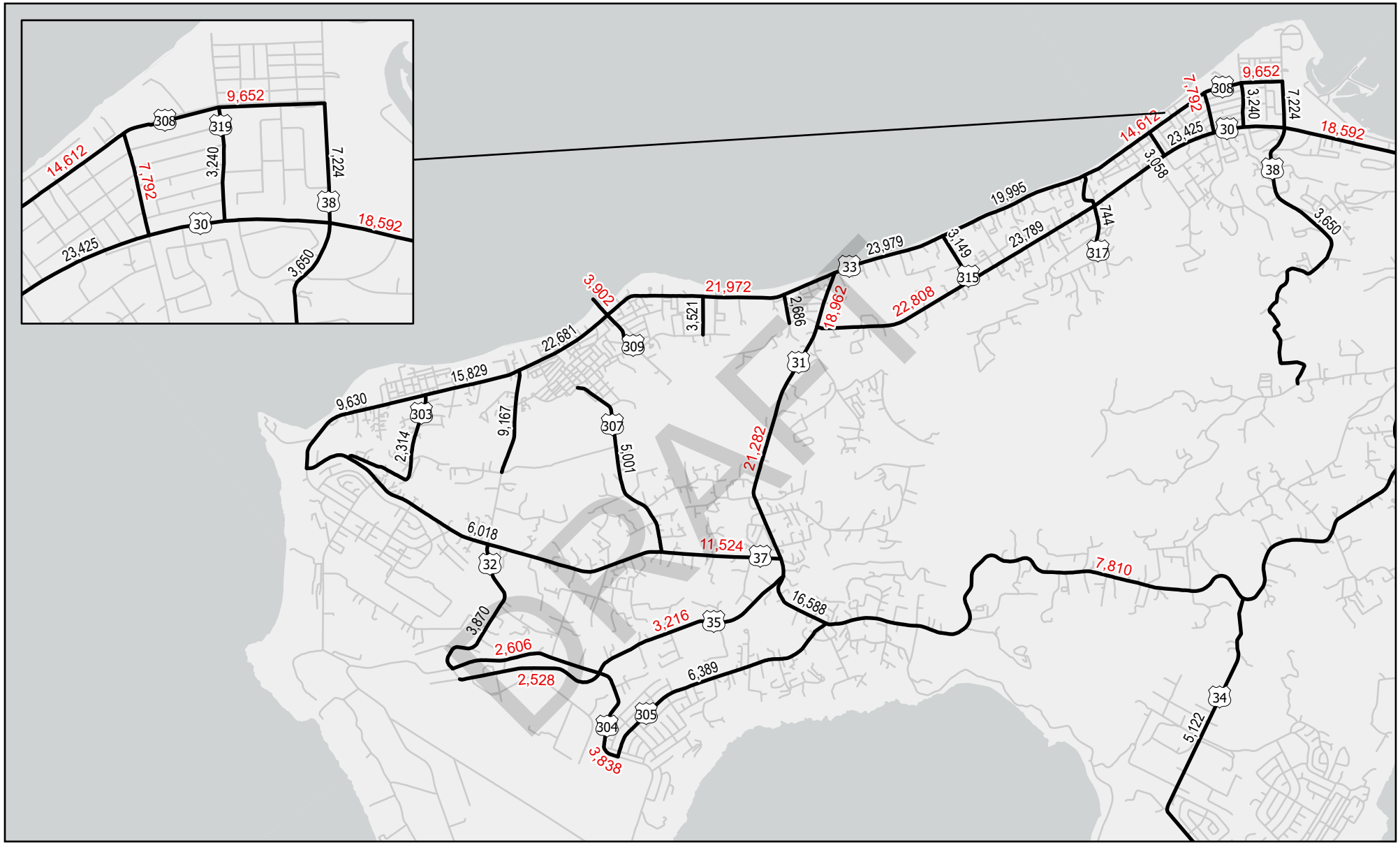
ID	Count Roadway & Location	2008 Study Volume	Updated Current Volume	Current Count Year	2008 to Current Difference	Percent Change
S-1*	Route 33 North of Route 308	27,080	9,652	2021	-17,428	-64%
S-2*	Route 33 South of Route 308	27,080	14,612	2021	-12,468	-46%
S-5	Route 33 South of Tekken Street	39,890	21,972	2021	-17,918	-45%
S-11	Route 30 CPA North of Route 38 Micro Beach	23,180	18,592	2021	-4,588	-20%
S-12	CPA Route 30 South of Route 38 Micro Beach	30,870	4,308	2017		
S-14	CPA Route 30 North of Route 31 Isa Dr.	27,820	22,808	2021	-5,012	-18%
S-15	Route 31 Isa Dr. West Bound of CPA Route 30	22,330	18,962	2021	-3,368	-15%
S-16	Route 31 East of Route 30	29,040	21,282	2021	-7,758	-27%
S-16**	Route 31 North of Route 37	29,040	7,094	2021		
S-17	Route 31 South of Route 37	N/A	16,588	2016		
S-18	Route 35 North of Route 304	5,280	3,216	2021	-2,064	-39%
S-19	Route 35 South of Route 304	6,950	2,528	2021	-4,422	-64%
S-20	Route 31 North of Route 316	8,490	8,362	2021	-128	-2%
S-21	Route 31 South of Route 216	8,490	7,810	2021	-680	-8%
S-23	Route 304 East of Route 35	4,760	3,838	2021	-922	-19%
S-24	Route 304 West of Route 35	2,930	2,606	2021	-324	-11%
S-25	Route 37 West of Route 31	13,180	11,524	2021	-1,656	-13%
S-33	Route 308 East of Route 33	8,300	7,792	2021	-508	-6%
S-35	Route 38 Micro Beach West of Route 30 CPA	9,520	4,510	2017	-5,010	
S-37	Route 38 East of Route 30 CPA	4,270	3,650	2017		
S-40	Route 30 North of Route 33	7,560	3,902	2021	-3,658	-48%
N/A	Route 316 East of Route 31	N/A	892	2021		
R-1	Route10 North of Esong (Pinatang Park)	1,730	1,508	2021	-222	-13%
R-2	Route 10 South of Route101	1,710	1,512	2021	-198	-12%
R-4	Route 100 South of Sinapalo II	970	616	2021	-354	-36%
R-9	San Ignacio Street North of Santa Ana Street	1,970	636	2021	-1,334	-68%
R-10	San Ignacio Street South of Songsong Look out.	1,290	512	2021	-778	-60%
T-9	Route 21 South of Route24 Joeten side	1,470	1,562	2021	92	6%
T-15	Route 201 West of Route 21	2,240	2,130	2021	-110	-5%
T-17	Route26 West-North of Route21	300	1,126	2021	826	275%
Average-percent Change from 2008 Study Volumes to 2021 Count Volumes						**-20.3%**

*These count locations show duplicate values in the 2008 report and likely represent the most heavily travelled section of segment S-2. As noted, many of the 2008 counts were based on escalated 1997 conditions, and likely overestimate actual traffic volumes in 2008 as they did not consider the decrease in travel between these respective years.

**Two counts were collected within the limits of study roadway segment S-16. Based on the greater similarity of the count collected east of Route 30 to the 2008 study volume, that count was used to represent the updated current volume on S-16 rather than the count collected north of Route 37.

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Legend

- Roadway Study Segments
- XX,XXX Estimated Daily Volumes
- XX,XXX 2021 Daily Count

Paper Size ANSI A

0 2,250 4,500

Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

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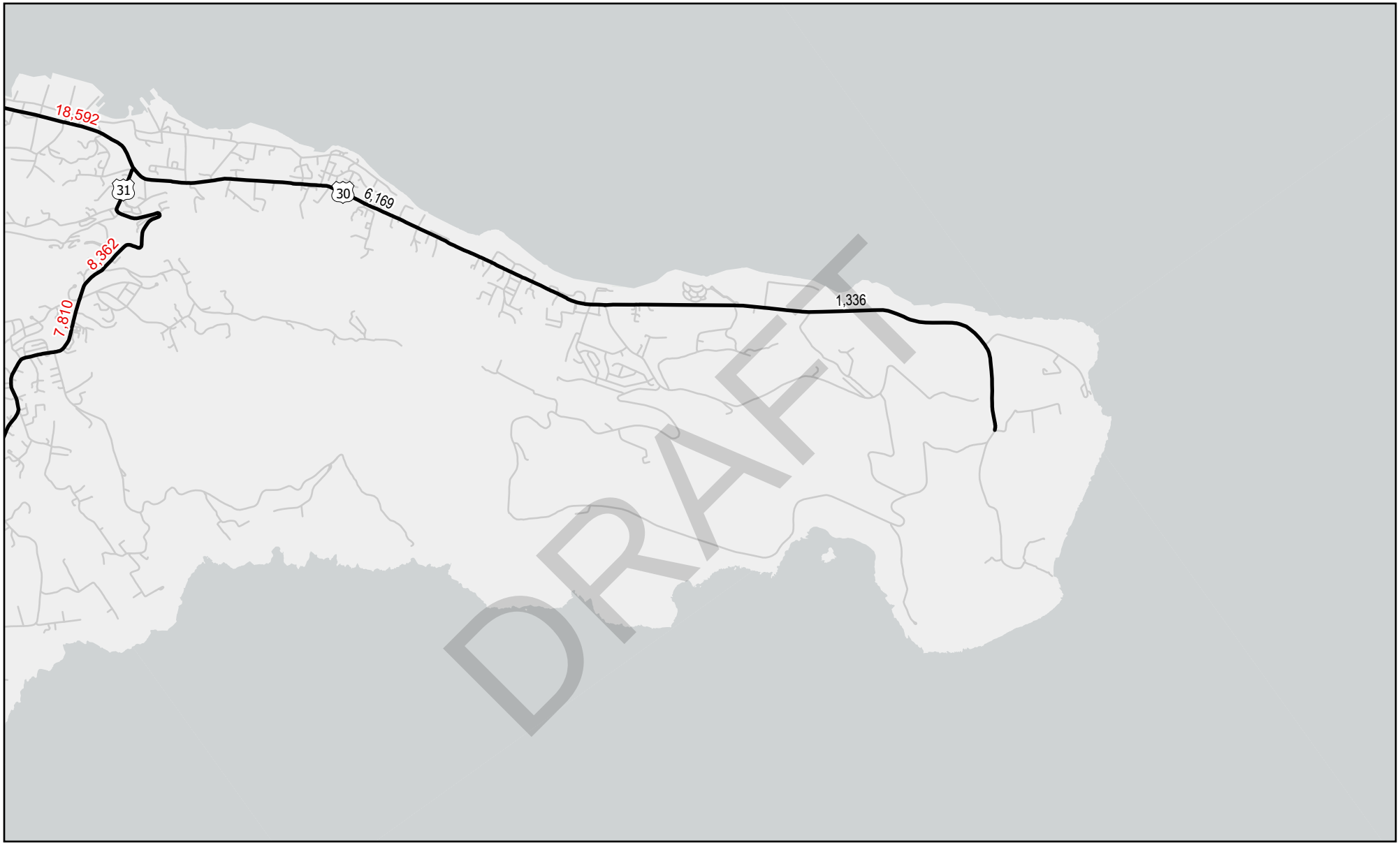
UPDATED CURRENT VOLUMES - SAIPAN

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

FIGURE 3-13

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Print date: 27 Jul 2022 - 12:56

Data source: Light Gray Base: BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, METI/NASA, USGS; 2021 Existing Counts: CNMI, 2021; 2021 Count Estimates: GHD, 2021. Created by: pthornton



Legend

Roadway Study Segments

XX,XXX Estimated Daily Volumes

XX,XXX 2021 Daily Count

Paper Size ANSI A

0 2,250 4,500

Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

Commonwealth of the Northern Mariana Islands
20 - Year Highway Master Plan

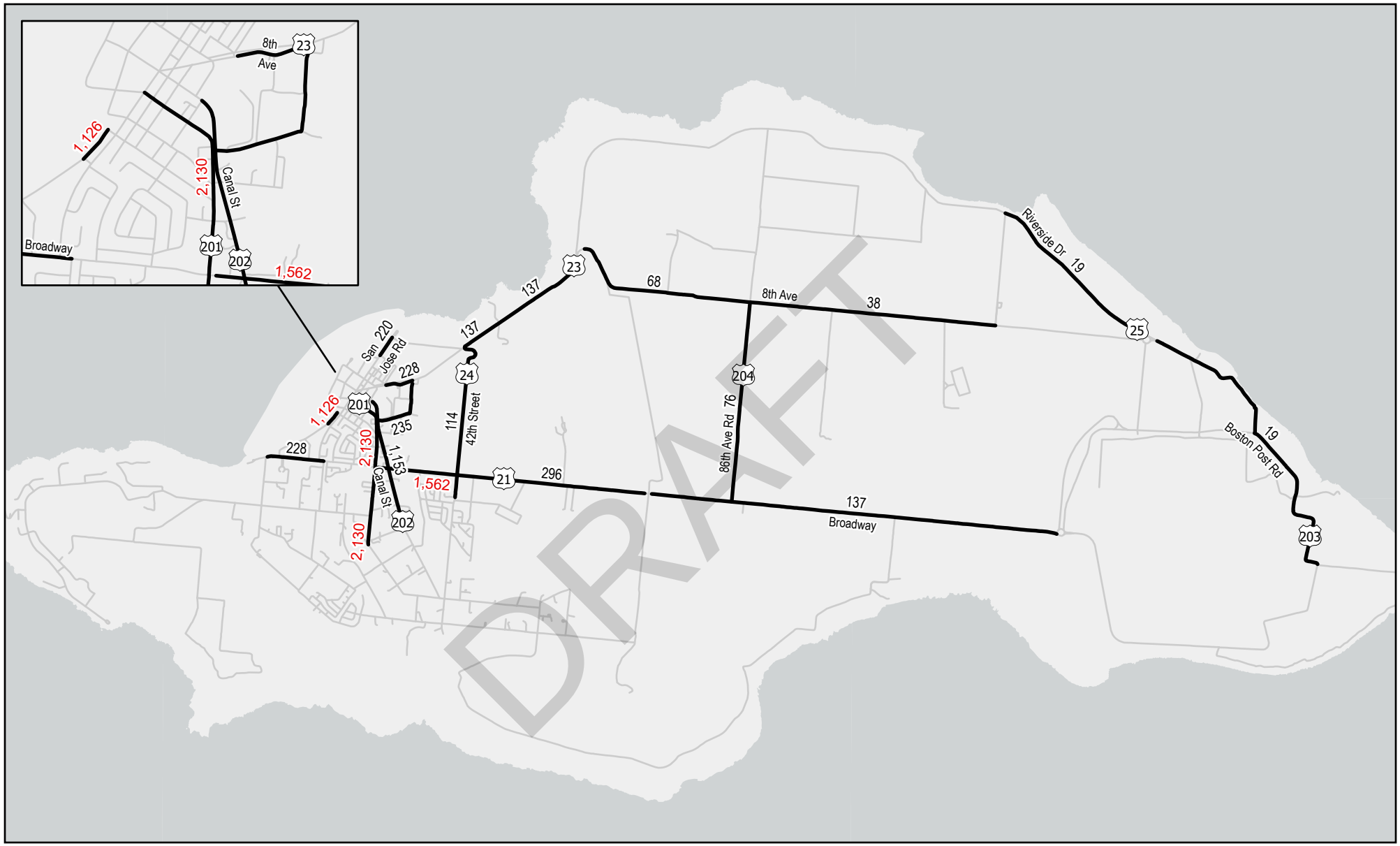
UPDATED CURRENT VOLUMES - SAIPAN (NORTH)

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

FIGURE 3-14

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_FIG 314_Updated Current Volumes_Saipan_2_North
Print date: 27 Jul 2022 - 12:57

Data source: World_Light_Gray_Reference: Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Light Gray Base: BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, METI/NASA, USGS
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Legend

- Roadway Study Segments
- XX,XXX Estimated Daily Volumes
- XX,XXX 2021 Daily Count

Paper Size ANSI A

0 1,500 3,000 4,500 6,000

Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

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Commonwealth of the Northern Mariana Islands
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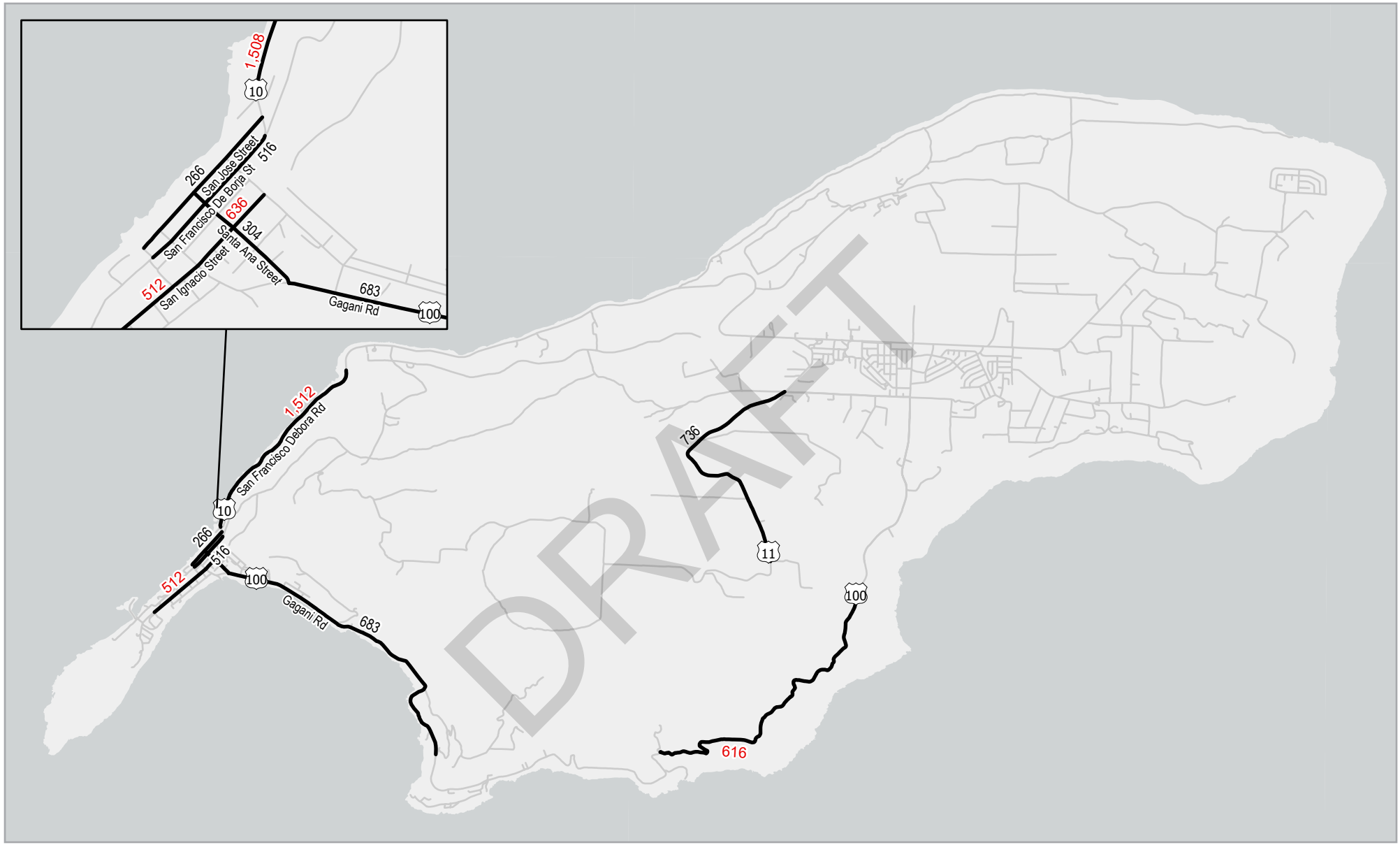
UPDATED CURRENT VOLUMES - TINIAN

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

FIGURE 3-15

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_FIG 315_Updated Current Volumes_Tinian
Print date: 27 Jul 2022 - 12:59

Data source: Light Gray Base: Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, METI/NASA, USGS; 2021 Existing Counts: CNMI, 2021; 2021 Count Estimates: GHD, 2021.
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Legend

Roadway Study Segments

XX,XXX Estimated Daily Volumes

XX,XXX 2021 Daily Count

Paper Size ANSI A

0 1,500 3,000 4,500 6,000

US Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

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Commonwealth of the Northern Mariana Islands
20 - Year Highway Master Plan

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

UPDATED CURRENT VOLUMES - ROTA

FIGURE 3-16

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_FIG 316_Updated Current Volumes_Rota
Print date: 27 Jul 2022 - 13:02

Data source: Light Gray Base: Esri Community Maps Contributors, Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, SafeGraph, METI/NASA, USGS
Light Gray Base: Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, SafeGraph, METI/NASA, USGS; 2021 Existing Counts: CNMI, 2021; 2021 Count Estimates: GHD, 2021. Created by: pthornton

3.7 Near-Term Recovery Traffic Conditions

As described in the preceding section, current traffic volumes (from 2016 to 2021) are significantly lower than traffic volumes reported in the 2008 Highway Master Plan. Consistent with the fluctuations observed over the past several decades, tourism to the islands decreased slightly from 2017 to 2019, following Super Typhoon Yutu in 2018 and prior to the COVID-19 travel restrictions. Once those restrictions were in place, tourism to the islands dropped dramatically below 2008 levels. In addition, population decreased slightly and employment remains fairly constant over the past decade.

Recognizing that the current travel conditions, including those observed during the COVID-19 pandemic, are not reflective of travel potential on the islands, this report evaluates the potential near-term increase of traffic should the tourism industry recover to recent conditions prior to COVID-19 and recent typhoons. As such this scenario is referred to as the Near-Term Recovery Condition and is intended to represent potential traffic volumes that could be reached within the next five to ten years, subject to continued reinvestment in economic development and the tourism industry.

Methodology

Due to the COVID-19 travel restrictions to/from CNMI, it was assumed that the traffic counts collected in 2021 did not include tourism-related traffic, which is typically a significant portion of total traffic volumes on CNMI roadways. Due to observed trends in population and employment over the past decade, it was also assumed that local (non-tourism) traffic volumes remained nearly constant between 2008 and 2021. Therefore, the difference between the traffic volumes reported in the 2008 Highway Master Plan and the new 2021 counts represents a conservative estimate of vehicular traffic that was generated by tourism to the islands in 2008.

As discussed in Section 2.5.1, pre-COVID-19 tourism had an average yearly increase of 2.1-percent from 2008 to 20189, growing from 397,271 visitors in 2008 to 487,008 visitors in 2019. As previous stated, the 2021 traffic volumes did not include tourism-related traffic and therefore does not accurately represent travel conditions for the purposes of this plan, considering potential to economic recovery in the near-term. To estimate tourism levels had the COVID-19 pandemic travel restrictions never occurred estimate, the tourism-related portion of the 2008 traffic volumes was escalated by the average annual growth rate of 2.1-percent over thirteen years (2008 to 2021). This tourism-related traffic volume was then added to the 2021 traffic counts to estimate the Near-Term Recovery Conditions volumes for roadway locations with 2021 counts. For roadway locations with counts collected in 2016 and 2017, prior to COVID-19 travel restrictions, traffic volumes were grown by the average tourism growth per year of 2.1-percent over five or four years, respectively, to estimate the Near-Term Recovery Conditions volumes.

The Near-Term Recovery Conditions volumes, presented in Table 3.14, are used for operational analysis of travel demand that could be reached within the next five to ten years and as a basis for estimating Long-Term (2040) Conditions volume forecasts.

Figures 3-17 through 3-20 present the Near-Term Recovery Conditions LOS results for the study roadway facilities.

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Table 3.14 Near-Term Recovery Conditions Estimated Roadway Volumes

ID	Route Name	Road Name	Location	2008 Study Volume (Consistent with locations included in the 2008 Highway Master Plan)	2021 Count Volume (Volume shown for locations where counts were collected)	Near-Term Recovery Conditions (All locations)	Percent Change from 2008 Study Volume
S-1	Rte 33	Beach Road	Micro Beach to Garapan Street	27,080	9,652	31,895	17.8%
S-2	Rte 33	Beach Road	Garapan Street to Route 317 (Gualo Rai Road)	27,080	14,612	30,525	12.7%
S-3	Rte 33	Beach Road	Gualo Rai Road to Quartermaster Road	26,350		30,905	17.3%
S-4	Rte 33	Beach Road	Quartermaster Road to Route 31 (Chalan Monsignor Guerrero)	31,600		37,065	17.3%
S-5	Rte 33	Beach Road	Route 31 (Chalan Monsignor Guerrero) to Chalan Hagoi	39,890	21,972	44,840	12.4%
S-6	Rte 33	Beach Road	Chalan Hagoi to As Perdido Road	29,890		35,055	17.3%
S-7	Rte 33	Beach Road	As Perdido Road to Afetna Road	20,860		24,465	17.3%
S-8	Rte 33	Beach Road	Afetna Road to Koblerville Road	12,690		14,885	17.3%
S-9	Rte 30	Middle Road/Chalan Pale Arnold	North end to As Matius Road	1,760		2,065	17.3%
S-10	Rte 30	Middle Road/Chalan Pale Arnold	As Matius Road to Route 31 (Isa Drive)	8,130		9,535	17.3%
S-11	Rte 30	Middle Road/Chalan Pale Arnold	Route 31 (Isa Drive) to Route 38 (Micro Beach Road)	23,180	18,592	24,450	5.5%
S-12	Rte 30	Middle Road/Chalan Pale Arnold	Route 38 (Micro Beach Road) to Route 317 (Gualo Rai Road)	30,870		36,205	17.3%
S-13	Rte 30	Middle Road/Chalan Pale Arnold	Route 317 (Gualo Rai Road) to Route 315 (Quartermaster Road)	31,350		36,770	17.3%
S-14	Rte 30	Middle Road/Chalan Pale Arnold	Route 315 (Quartermaster Road) to Route 31 (Chalan Monsignor	27,820	22,808	29,205	5.0%
S-15	Rte 31	Chalan Monsignor Guerrero	Route 33 (Beach Road) to Route 30 (Middle Road/Chalan Pale	22,330	18,962	23,265	4.2%
S-16	Rte 31	Chalan Monsignor Guerrero	Route 30 (Middle Road/Chalan Pale Arnold) to Chalan Msgr.	29,040	21,282	31,185	7.4%
S-17	Rte 31	Chalan Monsignor Guerrero	Tun Herman Pan Road to Route 305 (DanDan Road)	16,590		16,935	2.1%
S-18	Rte 35	Tun Herman Pan Road	Chalan Msgr Guerrero to Route 304 (Flame Tree Road)	5,280	3,216	5,855	10.9%
S-19	Rte 35	Tun Herman Pan Road	Route 304 (Flame Tree Road) to Airport	6,950	2,528	8,175	17.6%
S-20	Rte 31	Isla Drive	Route 30 (Middle Road/Chalan Pale Arnold) to Capitol Hill Road	8,490	8,362	8,530	0.5%
S-21	Rte 31	Isla Drive	Capitol Hill Road to Route 305 (DanDan Road)	7,530	7,810	8,680	15.3%
S-22	Rte 305	DanDan Road	Route 31 (Chalan Monsignor Guerrero) to Route 304 (Flame Tree Road)	8,420		9,875	17.3%
S-23	Rte 304	Flame Tree Road	Route 305 (DanDan Road) to Route 35 (Tun Herman Pan Road)	4,760	3,838	5,015	5.4%
S-24	Rte 304	Flame Tree Road	Route 35 (Tun Herman Pan Road) to Route 32 (As Perdido Road)	2,930	2,606	3,020	3.1%
S-25	Rte 37	Chalan Monsignor Martinez	Route 31 (Chalan Monsignor Guerrero) to Chalan Tun Joaquin Doi	13,180	11,524	13,640	3.5%
S-26	Rte 37	Chalan Monsignor Martinez	Chalan Tun Joaquin Doi to Route 33 (Beach Road)	7,930		9,305	17.3%
S-27	Rte 32	As Perdido Road	Route 33 (Beach Road) to Route 37 (Chalan Monsignor Martinez)	12,080		14,170	17.3%
S-28	Rte 32	As Perdido Road	Route 37 (Chalan Monsignor Martinez) to Route 35 (Tun Herman Pan Road)/Route 304 (Flame Tree Road)	5,100		5,985	17.4%
S-29	Rte 317	Gualo Rai Road	east of Route 33 (Beach Road)	980		1,150	17.3%
S-30	Rte 315	Quartermaster Road	east of Route 33 (Beach Road)	4,150		4,870	17.3%
S-31	Rte 307	Chalan Tun Antonio APA	Route 31 (Chalan Monsignor Guerrero) to Chalan Tun Joaquin Doi	6,590		7,730	17.3%
S-32		Ropa Di Oru Street	east of Route 33 (Beach Road)	4,030		4,730	17.4%
S-33	Rte 308	Garapan Street	east of Route 33 (Beach Road)	8,300	7,792	8,445	1.7%
S-34	Rte 319	CPL Derence Jack Road	east of Route 33 (Beach Road)	4,270		5,010	17.3%
S-35	Rte 38	Micro Beach Road)	east of Route 33 (Beach Road)	9,520		11,170	17.3%

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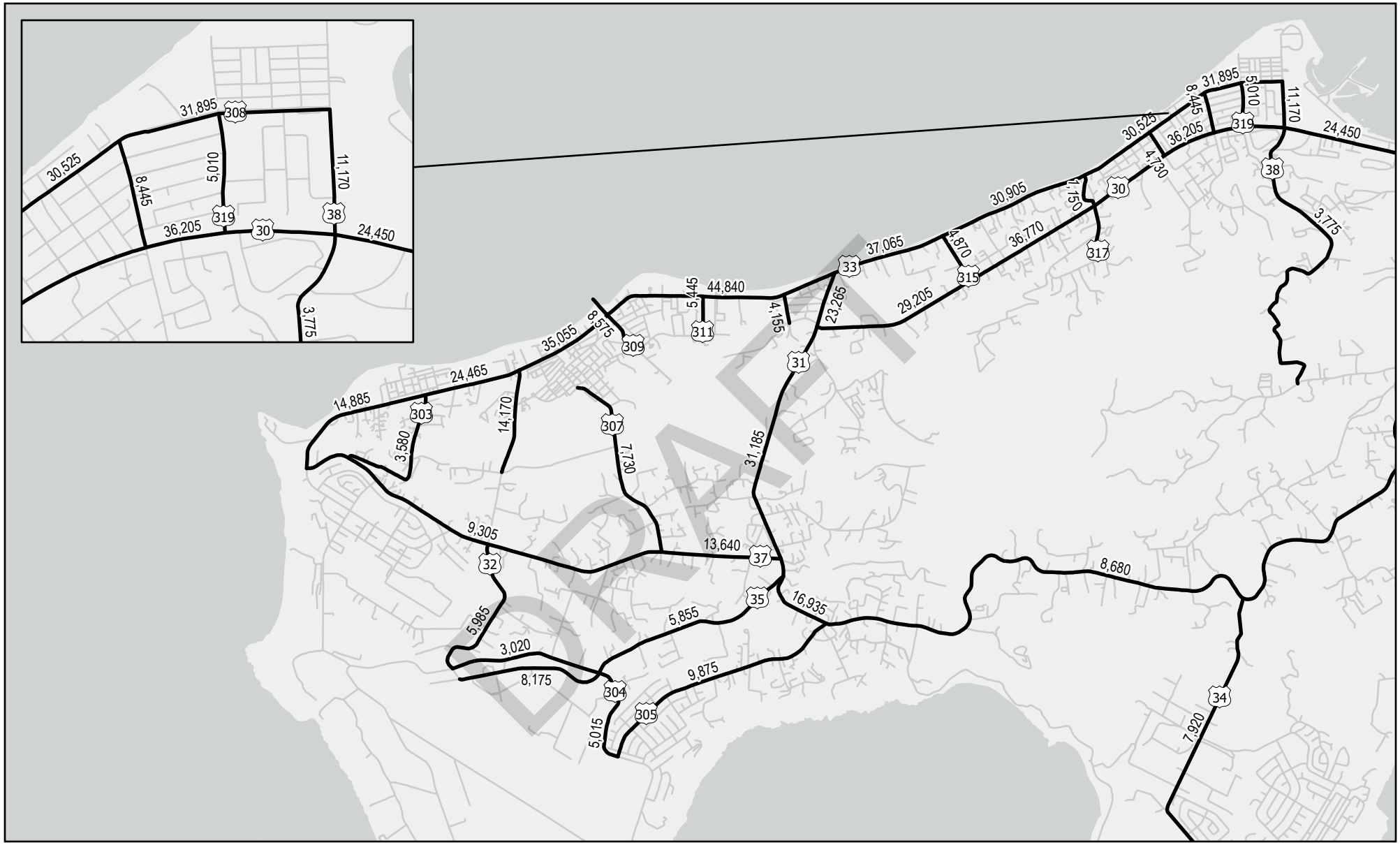
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Table 3.14 Near-Term Recovery Conditions Estimated Roadway Volumes

ID	Route Name	Road Name	Location	2008 Study Volume (Consistent with locations included in the 2008 Highway Master Plan)	2021 Count Volume (Volume shown for locations where counts were collected)	Near-Term Recovery Conditions (All locations)	Percent Change from 2008 Study Volume
S-36	Rte 303	Afetna Road	east of Route 33 (Beach Road)	3,050		3,580	17.4%
S-37	Rte 38	Navy Hill Road)	east of Route 30 (Middle Road/Chalan Pale Arnold)	4,270		3,715	-13.0%
S-38		Oleai Street	east of Beach Road	3,540		4,155	17.4%
S-39	Rte 311	Tekken Street	east of Beach Road	4,640		5,445	17.3%
S-40	Rte 309	Chalan Hagoi	east of Beach Road	7,560	3,902	8,575	13.4%
S-41	Rte 34	Kagman Road		6,750		7,920	17.3%
R-1	Rte 10		north of Esong (Pinatang Park)	1,730	1,508	1,795	3.8%
R-2	Rte 10		south of Rte 101	1,710	1,512	1,765	3.2%
R-3	Rte 100		east of Songsong Village and west of Pona Point	900		1,056	17.3%
R-4	Rte 100		south of Sinapalu	560	616	1,070	91.1%
R-5	Rte 11		south of Sinapalu	970		1,138	17.3%
R-6		San Jose Street	south of Rte 10	350		410	17.3%
R-7		San Francisco De Borja St	south of Rte 10	680		798	17.3%
R-8		Santa Ana Street	San Jose St to Rte 100	400		469	17.3%
R-9		San Ignacio Street	north of Santa Ana Street	1,970	636	2,340	18.8%
R-10		San Ignacio Street	south of Santa Ana Street	1290	512	1,505	16.7%
T-1		Riverside Drive	east of 8th Street	25		29	17.3%
T-2		Riverside Drive	west of 8th Street	25		29	17.3%
T-3		No name (Mt Lasso Shinto Shrine)	east of 8th Street	50		59	17.3%
T-4		8th Street	north of 86th Street	50		59	17.3%
T-5		8th Street	south of 86th Street	90		106	17.3%
T-6		86th Ave	8th Street to Broadway	100		117	17.3%
T-7	Rte 21	Broadway	north of 86th Street	180		211	17.3%
T-8	Rte 21	Broadway	north of 42nd Street	390		457	17.3%
T-9	Rte 21	Broadway	42nd Street to Rte 201	1,470	1,562	1,595	8.5%
T-10		42nd Street	west of Broadway	150		176	17.3%
T-11		8th Street	north of 42nd Street to Riverside Dr	180		211	17.3%
T-12		No Name (School Road)	Rte 202 to 8th Street	310		364	17.3%
T-13		8th Street	north of Canal Street	300		352	17.3%
T-14	Rte 202	Canal Street	west of Broadway	1,520		1,783	17.3%
T-15	Rte 201		west of Broadway	2,240	2,130	2,275	1.6%
T-16	Rte 21	Broadway	south end / north of Wall Street	300		352	17.3%
T-17	Rte 21	No name	at Bus Stop / south of Kammer Beach	300	1,126	1,150	283.3%
T-18		No Name	road north of Breakwater Park	290		340	17.3%

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Legend

Roadway Study Segments

XX,XXX Estimated Daily Volumes

Paper Size ANSI A

0 2,250 4,500

US Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

Commonwealth of the Northern Mariana Islands
20 - Year Highway Master Plan

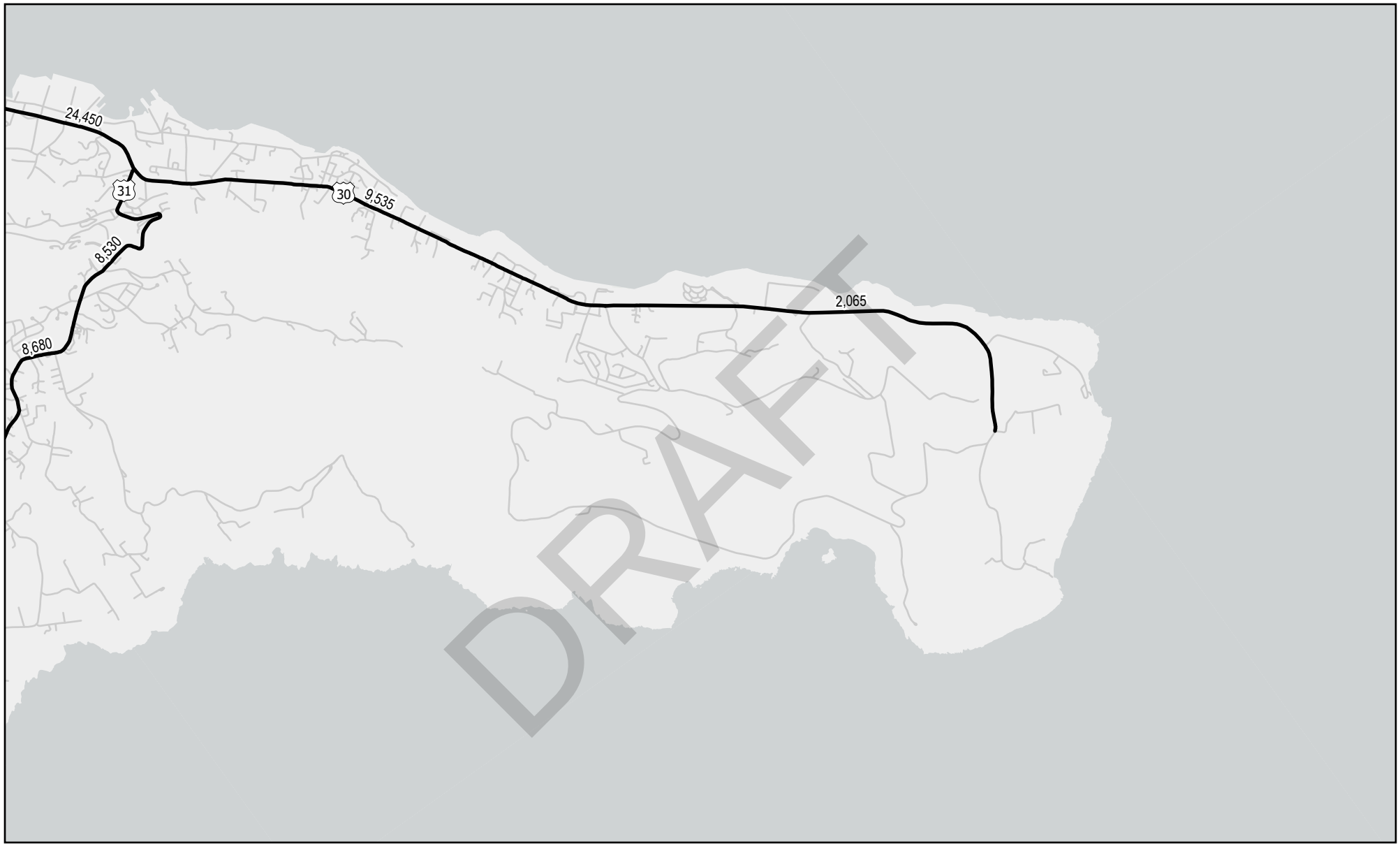
NEAR-TERM RECOVERY CONDITIONS VOLUMES - SAIPAN

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

FIGURE 3-17

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_FIG 317_Near-Term Recovery Conditions Volumes_Saipan1
Print date: 27 Jul 2022 - 13:05

Data source: Light Gray Base: BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, METI/NASA, USGS; 2021 Existing Counts: CNMI, 2021; 2021 Count Estimates: GHD, 2021. Created by: pthornton



Legend

Roadway Study Segments

XX,XXX Estimated Daily Volumes

Paper Size ANSI A

0 2,250 4,500

Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

Commonwealth of the Northern Mariana Islands

20 - Year Highway Master Plan

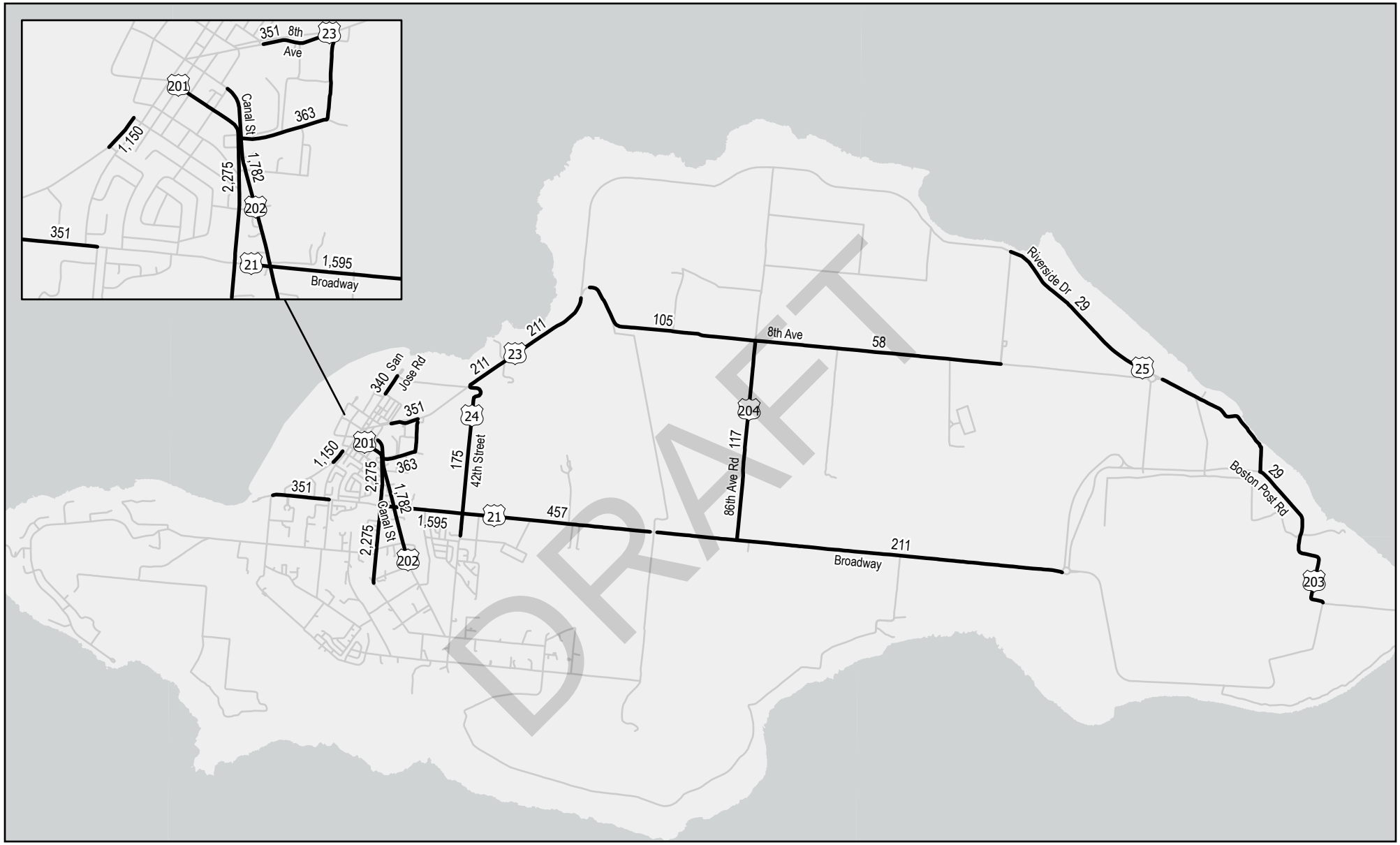
NEAR-TERM RECOVERY CONDITIONS VOLUMES - SAIPAN (NORTH)

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

FIGURE 3-18

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_FIG 318_Near-Term Recovery Conditions Volumes_Saipan_2_North
Print date: 27 Jul 2022 - 13:08

Data source: Light Gray Base: BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, METI/NASA, USGS
World_Light_Gray_Base: Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community; 2021
Existing Counts: CNMI, 2021; 2021 Count Estimates: GHD, 2021. Created by: pthornton



Legend

- Roadway Study Segments
- XX,XXX Estimated Daily Volumes

Paper Size ANSI A

0 1,500 3,000 4,500 6,000

Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

N

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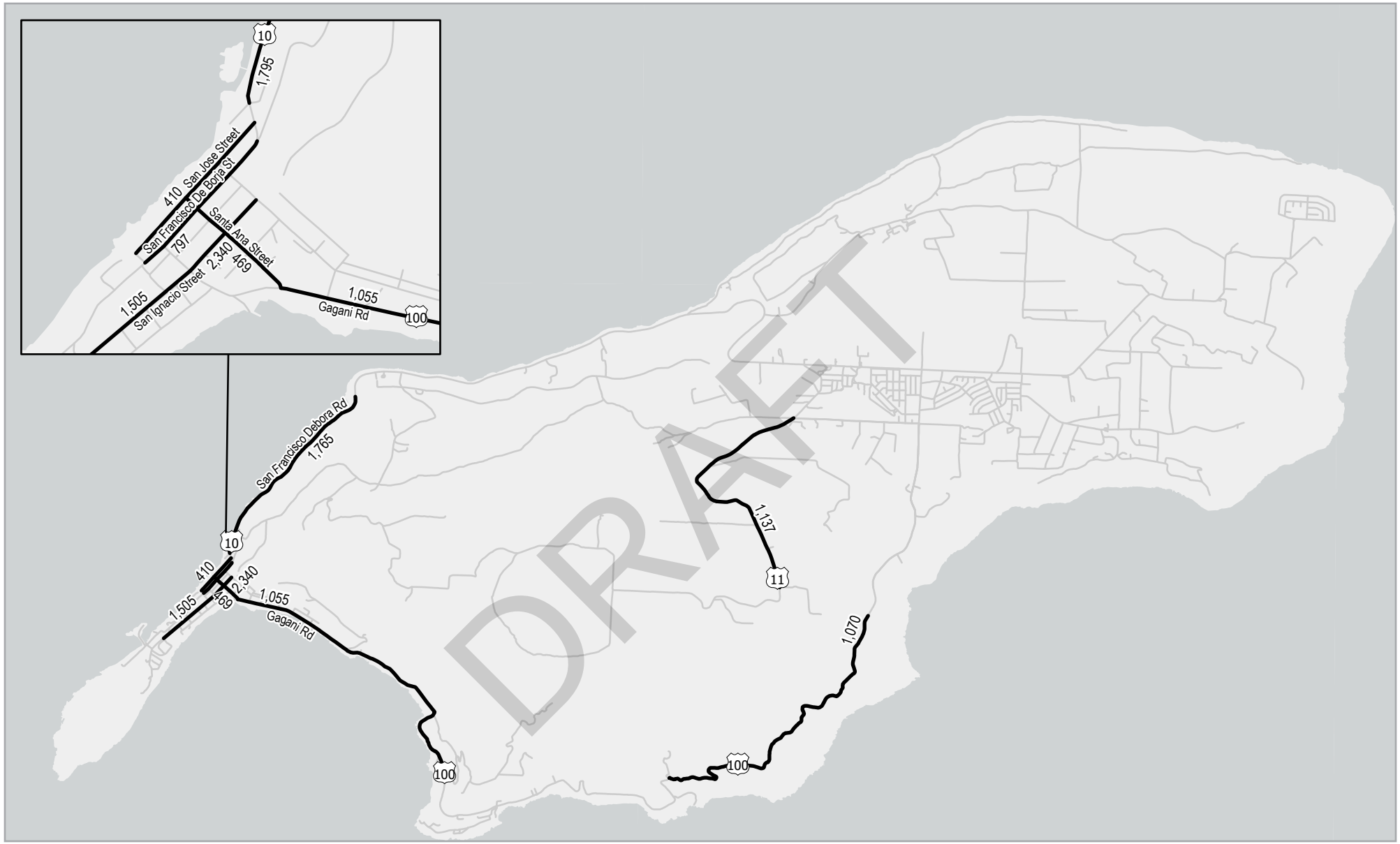
NEAR-TERM RECOVERY CONDITIONS VOLUMES - TINIAN

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Date **Jul 2022**

FIGURE 3-19

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_FIG 319_Near-Term Recovery Conditions Volumes_Tinian
Print date: 27 Jul 2022 - 13:09

Data source: Light Gray Base: Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, METI/NASA, USGS; 2021 Existing Counts: CNMI, 2021; 2021 Count Estimates: GHD, 2021. Created by: pthornton



Legend

Roadway Study Segments

XX,XXX Estimated Daily Volumes

Paper Size ANSI A

0 1,500 3,000 4,500 6,000

US Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

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NEAR-TERM RECOVERY CONDITIONS VOLUMES - ROTA

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FIGURE 3-20

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_FIG 320_Near-Term Recovery Conditions Volumes_Rota
Print date: 27 Jul 2022 - 13:11

Data source: Light Gray Base: Esri Community Maps Contributors, Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, SafeGraph, METI/NASA, USGS
Light Gray Base: Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, SafeGraph, METI/NASA, USGS; 2021
Existing Counts: CNMI, 2021; 2021 Count Estimates: GHD, 2021. Created by: pthornton

3.7.1 Near-Term Recovery Conditions Roadway Operations

Roadway segment Level of Service (LOS) standards and thresholds provide the basis for the analysis of roadway segment performance. The analysis of roadway segment LOS is based on the roadway functional classification, maximum capacity, geometrics, and peak hour traffic volumes. The Near-Term Recovery Conditions daily volume estimates were converted to peak hour roadway volume estimates through a set of proportionality factors (k factors), where the peak hour volume represents a proportion of total daily traffic on the same roadway.

To establish k factors, 2008 peak hour volumes on study roadway segments were compared to 2008 daily counts from the previous Highway Master Plan. The 2008 k factors were applied to Near-Term Recovery Conditions daily volumes for respective locations. To estimate peak hour roadway volume on the remaining study roadway segments without 2008 peak hour data, a weighted average of 2008 k factors was calculated for ranges of daily traffic volumes, where k factors for higher volume roadways differed from k factors for lower volume roadways, at 5,000 vehicle intervals. According to this data set, the higher-volume roadways tend to have lower k factors (less pronounced peak hours, where the peak hour volume represents a lower-percentage of total daily volume on the roadway facility). Resulting k factors were applied to Near-Term Recovery Conditions daily volume estimates at the remaining roadway locations based on the daily volume used to establish Near-Term Recovery Conditions peak hour volumes.

The LOS thresholds used in this analysis of roadways, presented in Table 3.15, are drawn from the State of Florida Department of Transportation *2020 Quality/Level of Service Handbook*., specifically, the methodology for peak hour two-way volume thresholds for roadways in urbanized areas. The analysis and resulting LOS determinations discussed in this section were based upon the comparison of Near-Term Recovery Conditions peak hour estimates to these roadway thresholds. **Roadways with LOS grades of LOS D or better are considered to operate at acceptable conditions, while roadways at LOS E or F are considered to operate deficiently. In cases where the LOS volume thresholds can only determine that the segment is operating at LOS E or F, the segment is considered to operate deficiently.**

Since the CNMI currently has a different roadway classification system than that listed in Table 3.15, the study roadways in Saipan, Tinian, and Rota were assigned to one of the roadway classifications listed in the table that best matches the corresponding roadway characteristics. In general, the existing 4-lane primary arterials were considered as 4-lane major arterials, and existing secondary arterials as either minor arterials or collectors.

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Table 3.15 Roadway Segment Level of Service Thresholds

Roadway Classification	LOS Thresholds (upper bounds)				
	A	B	C	D	E
Class I Signalized Arterial (≥ 40mph), 2-lane	-	-	1,590	1,680	-
Class I Signalized Arterial (≥ 40mph), 4-lane	-	-	3,420	3,580	-
Class I Signalized Arterial (≥ 40mph), 6-lane	-	-	5,250	5,390	-
Class I Signalized Arterial (≥ 40mph), 8-lane	-	-	7,090	7,210	-
Class II Signalized Arterial (< 40mph), 2-lane	-	-	690	1,400	1,480
Class II Signalized Arterial (< 40mph), 4-lane	-	-	1,310	2,920	3,040
Class II Signalized Arterial (< 40mph), 6-lane	-	-	2,090	4,500	4,590
Class II Signalized Arterial (< 40mph), 8-lane	-	-	2,880	6,060	6,130
Uninterrupted Flow Highway, 2-lane	-	810	1,610	2,280	3,150
Uninterrupted Flow Highway, 4-lane	-	3,300	4,660	5,900	6,530
Uninterrupted Flow Highway, 6-lane	-	4,950	6,990	8,840	9,790

The FDOT methodology for determining LOS thresholds also includes several adjustment factors based on the presence of certain roadway features, as presented in Table 3.16. These adjustment factors are applied to the base thresholds in Table 3.15 above.

Table 3.16 Roadway Feature Threshold Adjustment Factors

Roadway Features			Adjustment Factor
Number of Lanes	Median Division	Left Turn Lanes	
2	Yes	Yes	5%
2	Yes	No	0%
2	No	Yes	-5%
2	No	No	-20%
More than 2	Yes	Yes	0%
More than 2	Yes	No	0%
More than 2	No	Yes	-5%
More than 2	No	No	-25%

Error! Reference source not found. presents the Near-Term Recovery Conditions scenario daily volume, estimated peak hour volume, and roadway LOS result for each study location, with segments operating at deficient LOS highlighted. As presented in this table the following study segments operate at deficient LOS (LOS E or F) during the PM peak hour under Near-Term Recovery Conditions:

S-2 Route 33 (Beach Road), Garapan Street to Gualo Rai Road
S-3 Route 33 (Beach Road), Gualo Rai Road to Quartermaster Road
S-5 Route 33 (Beach Road), Route 31 (Chalan Monsignor Guerrero) to Chalan Hagoi
S-6 Route 33 (Beach Road), Chalan Hagoi to As Perdido Road
S-8 Route 33 (Beach Road), Afetna Road to Koblerville Road
S-12 Route 30 (Middle Road/Chalan Pale Arnold), Route 38 (Micro Beach Road) to Route 317 (Gualo Rai Road)
S-13 Route 30 (Middle Road/Chalan Pale Arnold), Route 317 (Gualo Rai Road) to Route 315 (Quartermaster Road)

Figures 3-21 through 3-24 present the Near-Term Recovery Conditions LOS results for the study roadway facilities.

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Table 3.17 Near-Term Recovery Conditions Roadway LOS

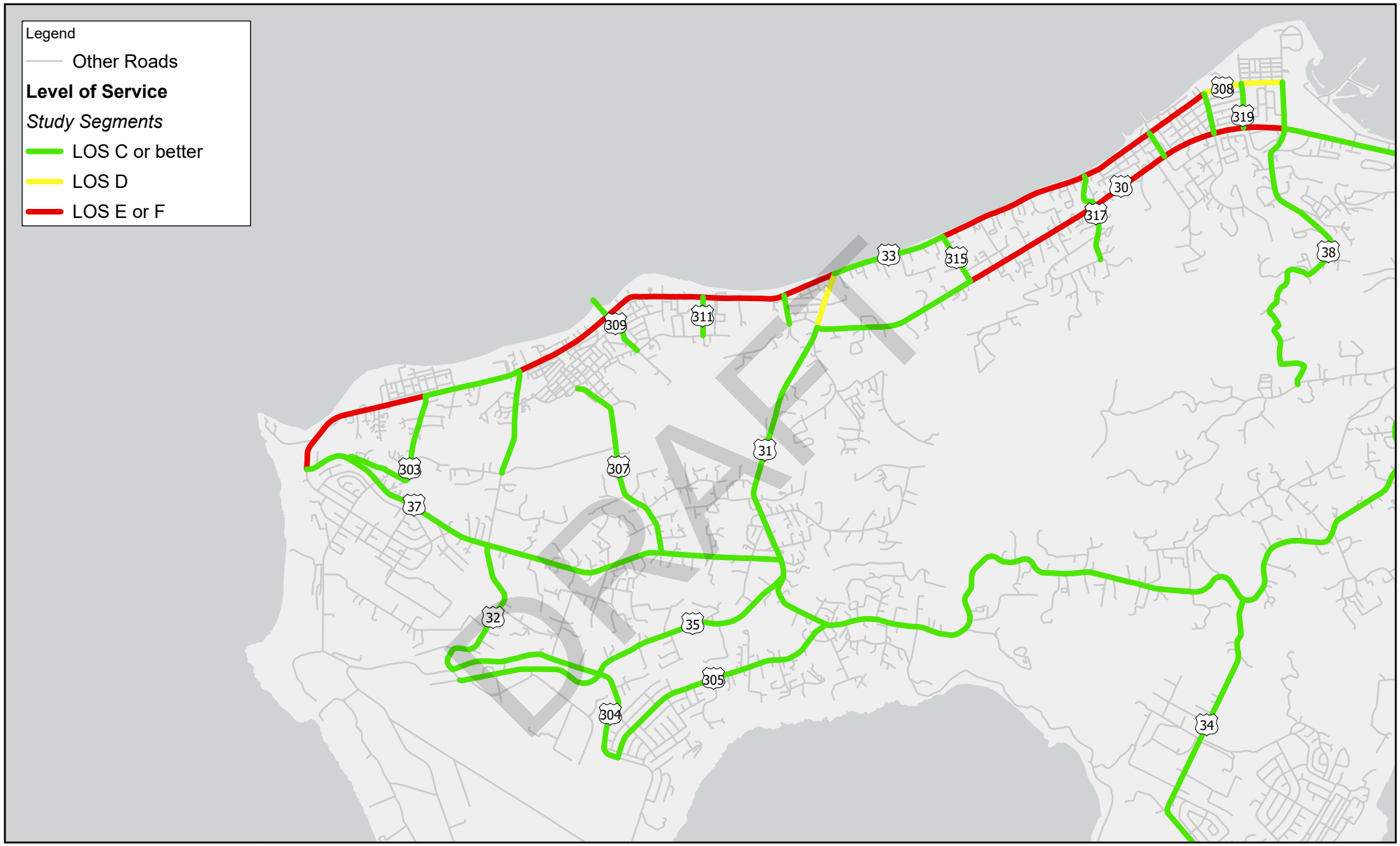
ID	Route Name	Road Name	Location	Roadway Classification	PM Peak Volume	PM Peak LOS
S-1	Rte 33	Beach Road	Micro Beach to Garapan Street	2-Lane Principal Arterial	1,020	D
S-2	**Rte 33**	Beach Road	**Garapan Street to Gualo Rai Road**	**2-Lane Principal Arterial**	**1,490**	**F**
S-3	**Rte 33**	Beach Road	**Gualo Rai Road to Quartermaster Road**	**2-Lane Principal Arterial**	**1,700**	**F**
S-4	Rte 33	Beach Road	Quartermaster Road to Route 31 (Chalan Monsignor Guerrero)	4-Lane Principal Arterial	2,290	C or better
S-5	**Rte 33**	Beach Road	**Route 31 (Chalan Monsignor Guerrero) to Chalan Hagoi**	**4-Lane Principal Arterial**	**2,800**	**E or F**
S-6	**Rte 33**	Beach Road	**Chalan Hagoi to As Perdido Road**	**4-Lane Principal Arterial**	**2,800**	**E or F**
S-7	Rte 33	Beach Road	As Perdido Road to Afetna Road	4-Lane Principal Arterial	1,790	C or better
S-8	**Rte 33**	Beach Road	**Afetna Road to Koblerville Road**	**2-Lane Principal Arterial**	**1,390**	**E**
S-9	Rte 30	Middle Road/Chalan Pale Arnold	North end to As Matius Road	2-Lane Principal Arterial	230	B or better
S-10	Rte 30	Middle Road/Chalan Pale Arnold	As Matius Road to Route 31 (Isa Drive)	4-Lane Principal Arterial	980	C or better
S-11	Rte 30	Middle Road/Chalan Pale Arnold	Route 31 (Isa Drive) to Route 38 (Micro Beach Road)	4-Lane Principal Arterial	2,780	C or better
S-12	**Rte 30**	Middle Road/Chalan Pale Arnold	**Route 38 (Micro Beach Road) to Route 317 (Gualo Rai Road)**	**4-Lane Principal Arterial**	**3,280**	**E or F**
S-13	**Rte 30**	Middle Road/Chalan Pale Arnold	**Route 317 (Gualo Rai Road) to Route 315 (Quartermaster Road)**	**4-Lane Principal Arterial**	**2,940**	**E or F**
S-14	Rte 30	Middle Road/Chalan Pale Arnold	Route 315 (Quartermaster Road) to Route 31 (Chalan Monsignor Guerrero)	4-Lane Principal Arterial	1,290	C or better
S-15	Rte 31	Chalan Monsignor Guerrero	Route 33 (Beach Road) to Route 30 (Middle Road/Chalan Pale Arnold)	4-Lane Principal Arterial	1,940	D
S-16	Rte 31	Chalan Monsignor Guerrero	Route 30 (Middle Road/Chalan Pale Arnold) to Chalan Msgr. Martinez	4-Lane Principal Arterial	1,910	C or better
S-17	Rte 31	Chalan Monsignor Guerrero	Tun Herman Pan Road to Route 305 (DanDan Road)	4-Lane Principal Arterial	1,410	C or better
S-18	Rte 35	Tun Herman Pan Road	Chalan Msgr Guerrero to Route 304 (Flame Tree Road)	2-Lane Minor Arterial	600	B or better
S-19	Rte 35	Tun Herman Pan Road	Route 304 (Flame Tree Road) to Airport	2-Lane Minor Arterial	840	B or better
S-20	Rte 31	Isa Drive	Route 30 (Middle Road/Chalan Pale Arnold) to Capitol Hill Road	2-Lane Principal Arterial	880	B or better
S-21	Rte 31	Isa Drive	Capitol Hill Road to Route 305 (DanDan Road)	2-Lane Principal Arterial	900	B or better
S-22	Rte 305	DanDan Road	Route 31 (Chalan Monsignor Guerrero) to Route 304 (Flame Tree Road)	2-Lane Major Collector	1,020	B or better
S-23	Rte 304	Flame Tree Road	Route 305 (DanDan Road) to Tun Herman Pan Road	2-Lane Major Collector	520	B or better
S-24	Rte 304	Flame Tree Road	Tun Herman Pan Road to Route 32 (As Perdido Road)	2-Lane Major Collector	340	B or better
S-25	Rte 37	Chalan Monsignor Martinez	Route 31 (Chalan Monsignor Guerrero) to Chalan Tun Joaquin Doi	2-Lane Minor Arterial	1,270	B or better
S-26	Rte 37	Chalan Monsignor Martinez	Chalan Tun Joaquin Doi to Route 33 (Beach Road)	2-Lane Minor Arterial	960	B or better
S-27	Rte 32	As Perdido Road	Route 33 (Beach Road) to Route 37 (Chalan Monsignor Martinez)	2-Lane Minor Arterial	1,320	B or better
S-28	Rte 32	As Perdido Road	Route 37 (Chalan Monsignor Martinez) to Tun Herman Pan Rd/Flame Tree Rd	2-Lane Minor Arterial	620	B or better
S-29	Rte 317	Gualo Rai Road	east of Route 33 (Beach Road)	2-Lane Major Collector	130	B or better
S-30	Rte 315	Quartermaster Road	east of Route 33 (Beach Road)	2-Lane Major Collector	550	B or better
S-31	Rte 307	Chalan Tun Antonio Apa	Route 31 (Chalan Monsignor Guerrero) to Chalan Tun Joaquin Doi	2-Lane Major Collector	800	B or better
S-32		Kopa Di Oru Street	east of Route 33 (Beach Road)	2-Lane Local	540	B or better
S-33	Rte 308	Garapan Street	east of Route 33 (Beach Road)	2-Lane Major Collector	870	B or better
S-34	Rte 319	CPL Derence Jack Road	east of Route 33 (Beach Road)	2-Lane Major Collector	520	B or better
S-35	Rte 38	Micro Beach Road	east of Route 33 (Beach Road)	2-Lane Minor Arterial	620	B or better
S-36	Rte 303	Afetna Road	east of Route 33 (Beach Road)	2-Lane Minor Collector	410	B or better
S-37	Rte 38	Navy Hill Road	east of Route 30 (Middle Road/Chalan Pale Arnold)	2-Lane Minor Collector	630	B or better

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ID	Route Name	Road Name	Location	Roadway Classification	PM Peak Volume	PM Peak LOS
S-38		Oleai Street	east of Route 33 (Beach Road)	2-Lane Major Collector	470	B or better
S-39	Rte 311	Tekken Street	east of Route 33 (Beach Road)	2-Lane Major Collector	560	B or better
S-40	Rte 309	Chalan Hagoi	east of Route 33 (Beach Road)	2-Lane Major Collector	880	B or better
S-41	Rte 34	Kagman Road		2-Lane Major Collector	820	B or better
R-1	Rte 10	Airport Road	north of Esong (Pinatang Park)	2-Lane Minor Arterial	200	C or better
R-2	Rte 10	Airport Road	south of Rte 101	2-Lane Minor Arterial	200	C or better
R-3	Rte 100	Talakhaya Road	east of Sonsong Village and west of Pona Point	2-Lane Major Collector	120	C or better
R-4	Rte 100	Eastern Loop Road	south of Sinapalu	2-Lane Major Collector	120	C or better
R-5	Rte 11	Coral Road	south of Sinapalu	2-Lane Major Collector	130	C or better
R-6		San Jose Street	south of Rte 10	2-Lane Local	50	C or better
R-7		San Francisco De Borja St	south of Rte 10	2-Lane Minor Arterial	90	C or better
R-8		Santa Ana Street	San Jose St to Rte 100	2-Lane Local	50	C or better
R-9		San Ignacio Street	north of Santa Ana Street	2-Lane Local	260	C or better
R-10		San Ignacio Street	south of Santa Ana Street	2-Lane Local	170	C or better
T-1		Riverside Drive	east of 8th Street	2-Lane Minor Collector	10	C or better
T-2		Riverside Drive	west of 8th Street	2-Lane Minor Collector	10	C or better
T-4		8th Street	north of 86th Street	2-Lane Minor Arterial	10	C or better
T-5		8th Street	south of 86th Street	2-Lane Minor Arterial	10	C or better
T-6		86th Ave	8th Street to Broadway	2-Lane Minor Collector	10	C or better
T-7	Rte 21	Broadway	north of 86th Street	2-Lane Minor Arterial	20	C or better
T-8	Rte 21	Broadway	north of 42nd Street	2-Lane Minor Arterial	50	C or better
T-9	Rte 21	Broadway	42nd Street to Rte 201	2-Lane Minor Arterial	180	C or better
T-10		42nd Street	west of Broadway	2-Lane Major Collector	20	C or better
T-11		8th Street	north of 42nd Street to Riverside Dr	2-Lane Minor Arterial	20	C or better
T-12		No Name (School Road)	Rte 202 to 8th Street	2-Lane Local	40	C or better
T-13		8th Street	north of Canal Street	2-Lane Minor Arterial	40	C or better
T-14	Rte 202	Canal Street	west of Broadway	2-Lane Major Collector	200	C or better
T-15	Rte 201	Grand Street	west of Broadway	2-Lane Major Collector	260	C or better
T-16	Rte 21	Broadway	south end / north of Wall Street	2-Lane Minor Arterial	40	C or better
T-17	Rte 21	No name	at Bus Stop / south of Kammer Beach	2-Lane Local	130	C or better
T-18		No Name	road north of Breakwater Park	2-Lane Major Collector	40	C or better

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Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

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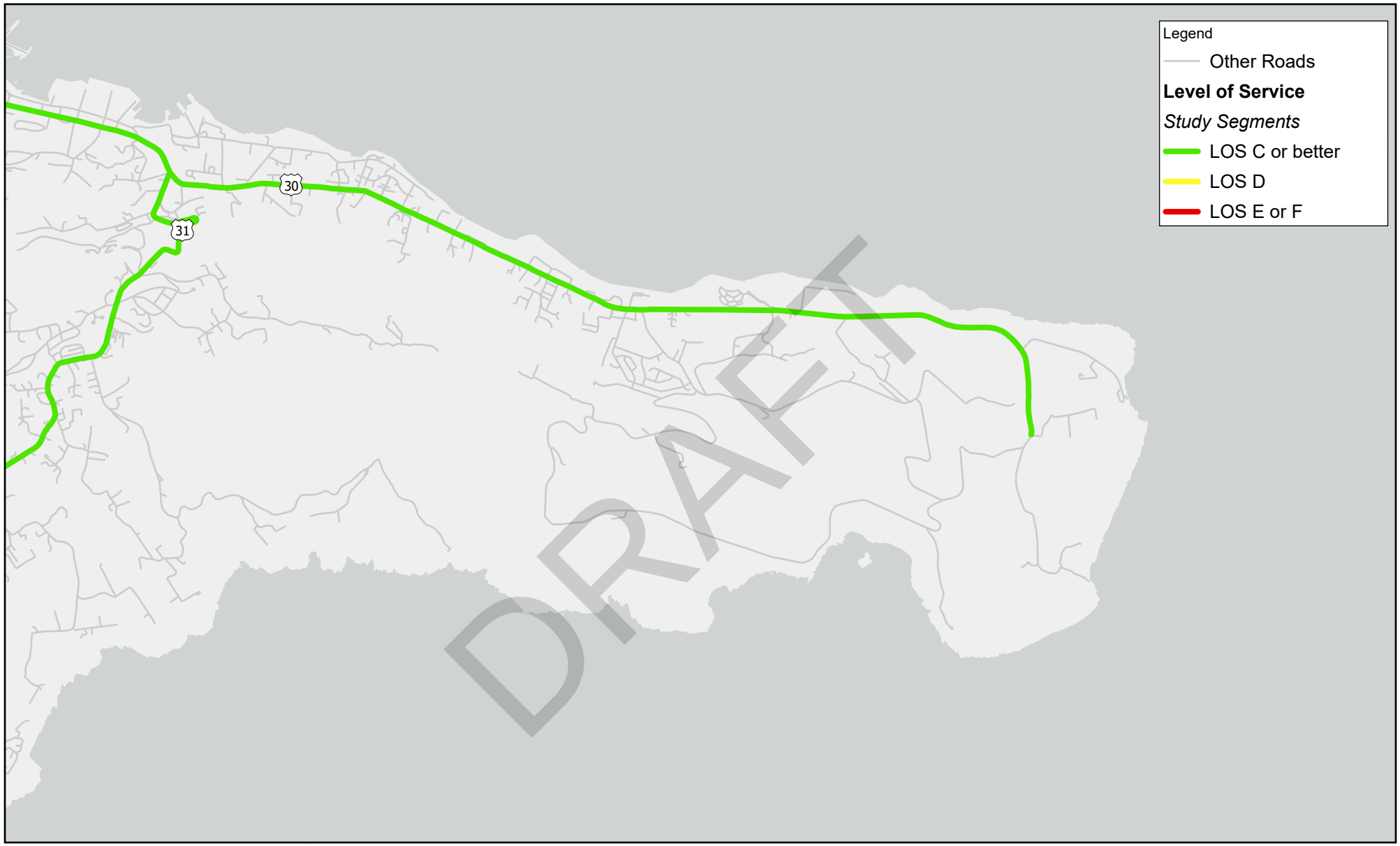
NEAR-TERM RECOVERY CONDITIONS LEVEL OF SERVICE - SAIPAN

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

FIGURE 3-21

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_FIG 321_Near-Term Recovery Conditions LOS_Saipan1
Print date: 27 Jul 2022 - 13:12

Data source: Light Gray Base: BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, METI/NASA, USGS. Created by: pthornton



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Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
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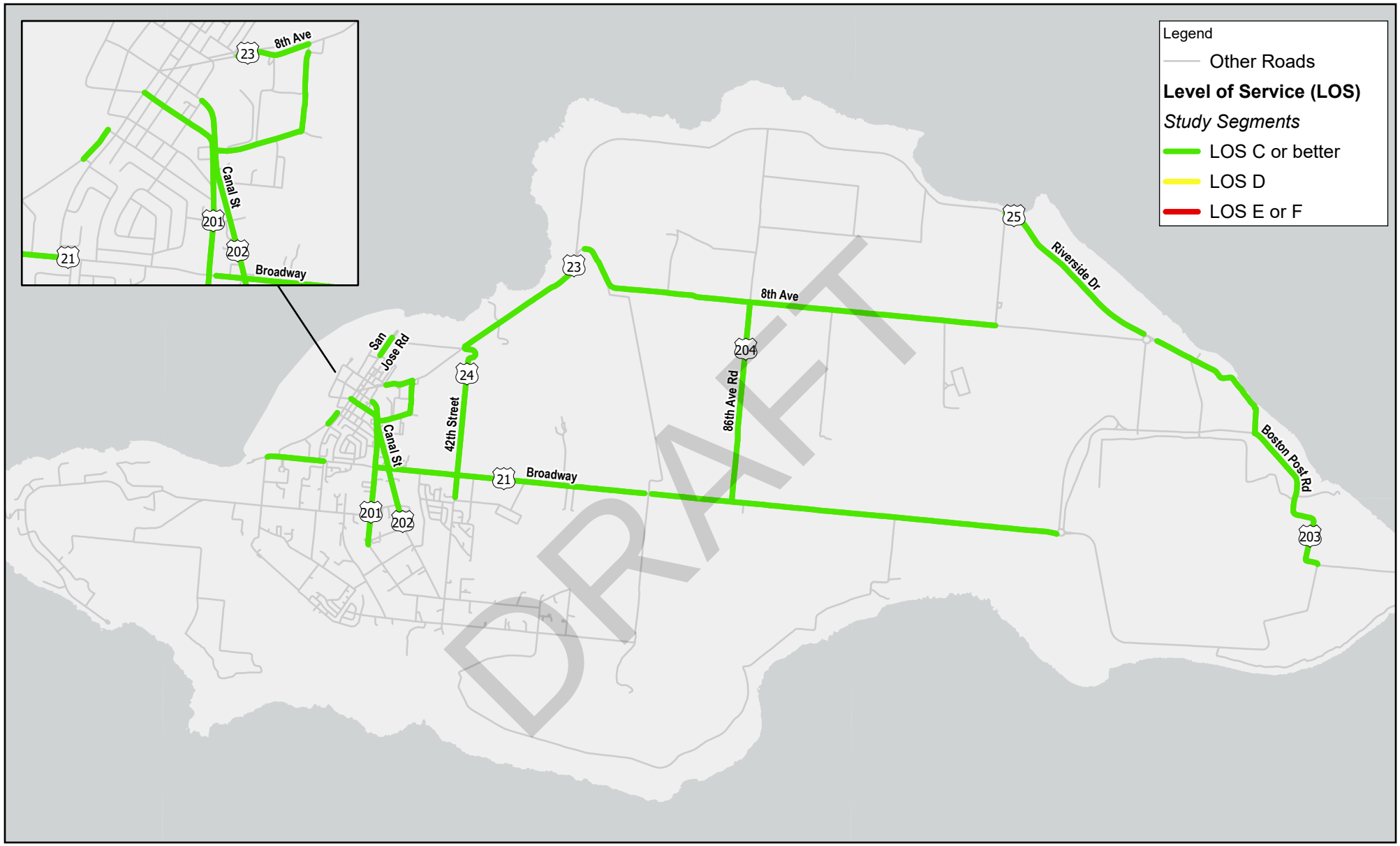
NEAR-TERM RECOVERY CONDITIONS LEVEL OF SERVICE - SAIPAN (NORTH)

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

FIGURE 3-22

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_FIG 322_Near-Term Recovery Conditions LOS_Saipan2_North
Print date: 27 Jul 2022 - 13:13

Data source: Light Gray Base: BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, METI/NASA, USGS. Created by: pthornton



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US Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

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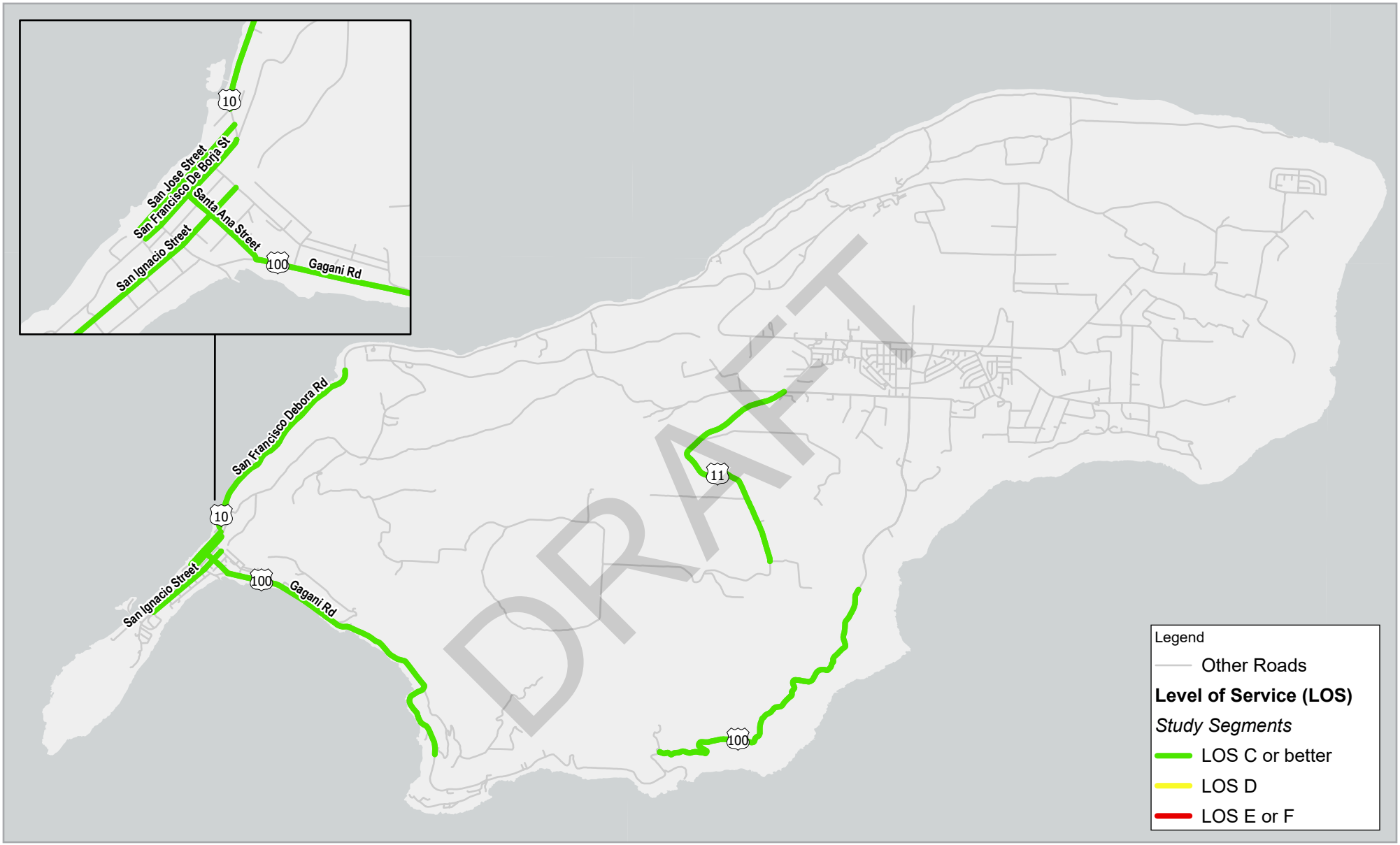
NEAR-TERM RECOVERY CONDITIONS LEVEL OF SERVICE - TINIAN

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

FIGURE 3-23

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_FIG 323_Near-Term Recovery Conditions LOS_Tinian
Print date: 27 Jul 2022 - 13:14

Data source: Light Gray Base: Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, METI/NASA, USGS.
Created by: pthornton



Paper Size ANSI A

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US Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

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NEAR-TERM RECOVERY CONDITIONS LEVEL OF SERVICE - ROTA

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Date **Jul 2022**

FIGURE 3-24

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_FIG 324_Near-Term Recovery Conditions Roadway LOS_Rota
Print date: 27 Jul 2022 - 13:15

Data source: Light Gray Base: Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, SafeGraph, METI/NASA, USGS. Created by: pthornton

3.7.2 Near-Term Recovery Conditions Intersection Operations

The Synchro 10 (Trafficware) software program was used to implement the HCM 6 analysis methodologies for signalized and stop-controlled intersections. Intersection Level of Service (LOS) was calculated for all control types using the methods documented in HCM 6. For signalized or all-way stop-controlled (AWSC) intersections, an LOS determination is based on the calculated averaged delay for all approaches and movements. For two-way or side-street stop controlled (TWSC) intersections, an LOS determination is based upon the calculated average delay for all movements of the worst performing approach. The vehicular-based LOS criteria for different types of intersection controls are presented in Table 3.18.

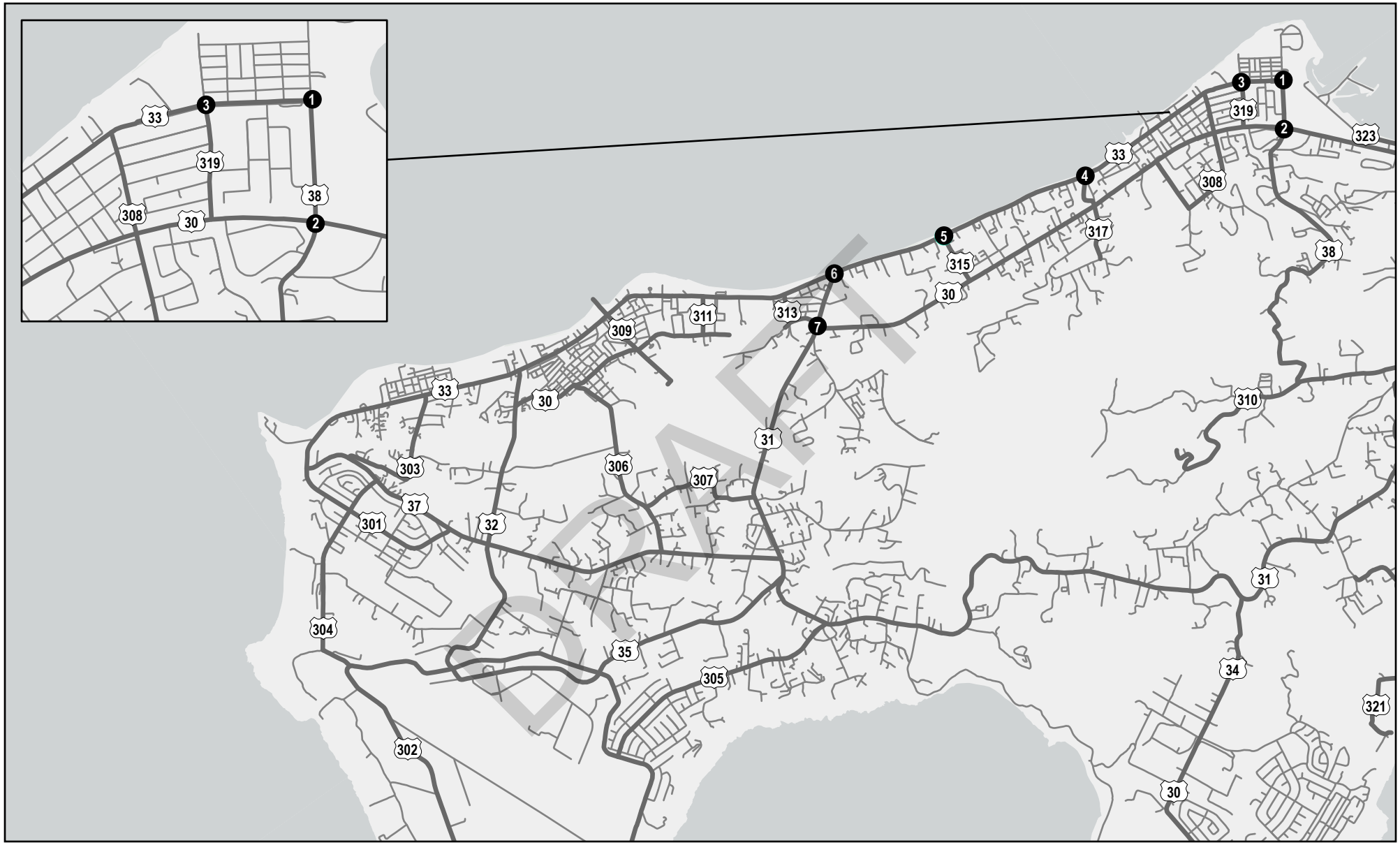
Figure 3-25 presents the locations of the study intersections, all of which are on Saipan. The peak hour counts collected for the 2008 study were escalated to Near-Term Recovery Conditions using a factor of 17.3%, the average growth from the 2008 study daily roadway volumes to the Near-Term Recovery Conditions daily roadway volume estimates. Figure 3-26 presents the Near-Term Recovery Conditions peak hour turning movement volume estimates that were utilized for the intersection LOS analysis.

Table 3.18 Level of Service (LOS) Criteria for Intersections

Level of Service	Type of Flow	Delay	Maneuverability	Stopped Delay per Vehicle	
				Signalized	Un-signalized
A	Stable Flow	Very slight delay. Progression is very favorable, with most vehicles arriving during the green phase not stopping at all.	Turning movements are easily made, and nearly all drivers find freedom of operation.	≤10.0	≤10.0
B	Stable Flow	Good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.	Vehicle platoons are formed. Many drivers begin to feel somewhat restricted within groups of vehicles.	>10.0 and ≤20.0	>10.0 and ≤15.0
C	Stable Flow	Higher delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, although many still pass through the intersection without stopping.	Back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted	>20.0 and ≤35.0	>15.0 and ≤25.0
D	Approaching Unstable Flow	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	Maneuverability is severely limited during short periods due to temporary back-ups.	>35.0 and ≤55.0	>25.0 and ≤35.0
E	Unstable Flow	Generally considered to be the limit of acceptable delay. Indicative of poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures are frequent occurrences.	There are typically long queues of vehicles waiting upstream of the intersection.	>55.0 and ≤80.0	>35.0 and ≤50.0
F	Forced Flow	Generally considered to be unacceptable to most drivers. Often occurs with over saturation. May also occur at high volume-to-capacity ratios. There are many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors.	Jammed conditions. Back-ups from other locations restrict or prevent movement. Volumes may vary widely, depending principally on the downstream back-up conditions.	>80.0	>50.0

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Legend

- Study Intersections Locations
- Highways
- Other Roads

Paper Size ANSI A

0 2,250 4,500

US Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

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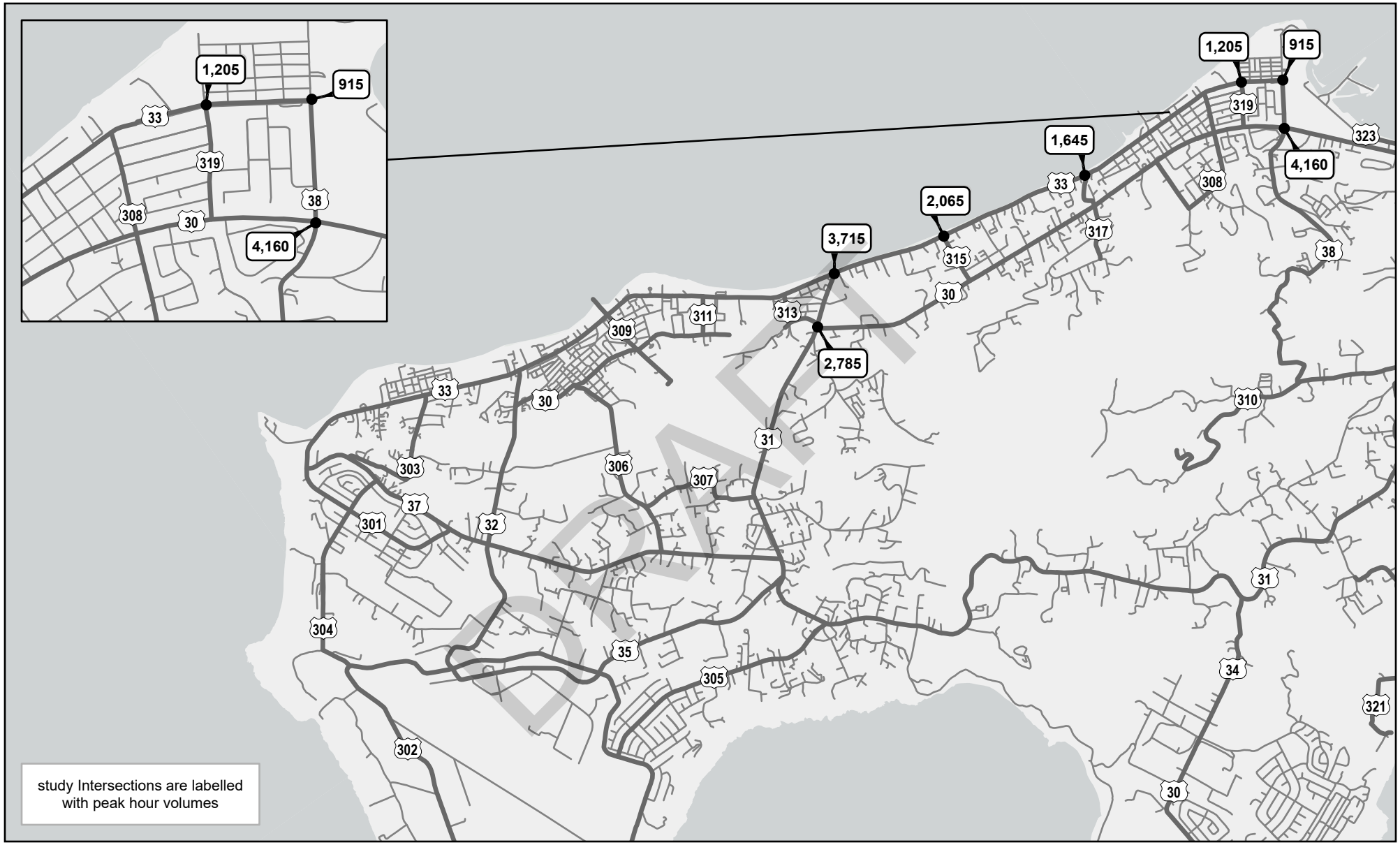
STUDY INTERSECTION LOCATIONS

Project No. **11224010**
Revision No. **-**
Date **Jun 2022**

FIGURE 3-25

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_FIG 325_Study Intersection Locations_Saipan
Print date: 29 Jun 2022 - 17:45

Data source: Light Gray Base: BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, METI/NASA, USGS. Created by: pthornton



Legend

- Study Intersections Locations
- Highways
- Other Roads

Paper Size ANSI A

0 2,250 4,500

US Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

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NEAR-TERM RECOVERY CONDITIONS - STUDY INTERSECTION PEAK HOUR VOLUMES

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

FIGURE 3-26

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_FIG 326_Near-Term Recovery Conditions Peak Hour Vol_Saipan
Print date: 27 Jul 2022 - 13:18

Data source: Light Gray Base: BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, METI/NASA, USGS. Created by: pthornton

Table 3.19 and Figure 3-27 present the PM peak hour intersection operations at study intersections under Near-Term Recovery Conditions, with deficient intersections highlighted. LOS results from the 2008 study are shown for comparison.

Table 3.19 Intersection Peak Hour LOS – Near-Term Recovery Conditions

#	Intersection	Control Type[1,2]	Target LOS	Near-Term Recovery Conditions PM Peak Hour		2008 PM Peak Hour
				Delay (sec/veh)	LOS	LOS
1	Route 33 (Beach Road) & Route 38 (Micro Beach Road)	AWSC	D	12.1	B	B
2	**Route 30 (Middle Road/Chalan Pale Arnold) & Route 38 (Micro Beach Road)**	**Signal**	**E**	**OVR**	**F**	D
3	**Route 33 (Beach Road) & Route 319 (CPL Derence Jack Road)**	**TWSC**	**E**	**93.5**	**F**	**F**
4	**Route 33 (Beach Road) & Route 317 (Gualo Rai Road)**	TWSC	E	48.8	E	C
5	**Route 33 (Beach Road) & Route 315 (Quartermaster Road)**	**TWSC**	**E**	**OVR**	**F**	**F**
6	**Route 33 (Beach Road) & Route 31 (Chalan Monsignor Guerrero)**	Signal	D	50.1	D	C
7	Route 30 (Middle Road/Chalan Pale Arnold) & Route 31 (Chalan Monsignor Guerrero)	Signal	D	29.5	C	B

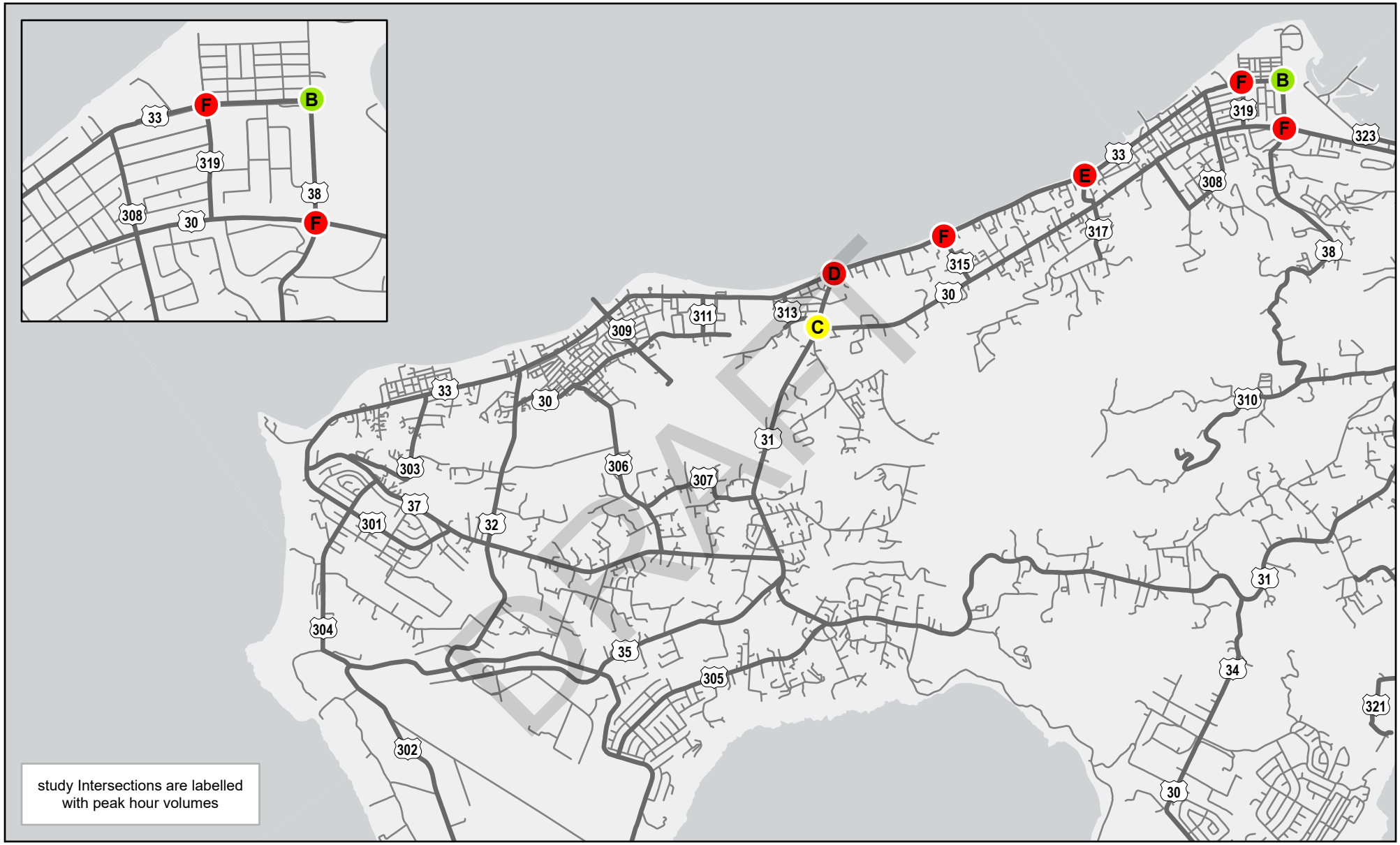
Notes:
1. *AWSC = All Way Stop Control; TWSC = Two Way Stop Control*
2. *LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC, Signal*
3. ***Bold** = Unacceptable Conditions*
4. *OVR = Delay over 300 seconds*

As presented in Table 3.18, the following study intersections operate at deficient LOS during the PM peak hour under Near-Term Recovery Conditions:

– Route 30 (Middle Road/Chalan Pale Arnold) & Route 38 (Navy Hill Road)
– Route 33 (Beach Road) & CPL Derence Jack Road
– Route 33 (Beach Road) & Route 317 (Gualo Rai Road)
– Route 33 (Beach Road) & Route 315 (Quartermaster Road)

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Legend

Level of Service (LOS)

- LOS C or better
- LOS D
- LOS E or F

- Highways
- Other Roads

Paper Size ANSI A

0 2,250 4,500

US Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

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NEAR-TERM RECOVERY CONDITIONS - STUDY INTERSECTION LOS

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

FIGURE 3-27

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_FIG 327_Near-Term Recovery Conditions Study Intersection LOS_Saipan
Print date: 27 Jul 2022 - 13:20

Data source: Light Gray Base: BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, METI/NASA, USGS. Created by: pthornton

3.8 Collision Analysis

Collision data for the island of Saipan spanning the year 2017 was provided by the Department of Public Safety and analyzed to identify trends. In 2017, there was a total of 1,325 collisions on the Highway Master Plan study facilities, including 163 injury and five (5) fatal collisions, as shown in Table 3.20. Most of these collisions (28-percent) were "rear end" collisions, where the front of one vehicle collides with the rear end of another vehicle.

Table 3.20 Total Collisions on Study Facilities

	TOTAL
Total	1,325
Non-Injury	1,157
Injury	163
Fatal	5

The five (5) fatalities occurred at the following locations:

- Chalan Pale Arnold, on the roadway approximately 400-feet west of Puetto Street:
  - Vehicle to vehicle collision (front-to-side)
  - Northbound travel direction of primary vehicle
- Chalan Monsignor Guerrero & Chalan Antionio Apa intersection:
  - Single vehicle collision
  - Eastbound travel direction of primary vehicle
  - Traffic signal intersection
- Chalan Monsignor Guerrero & Kannat Tabla Drive:
  - Vehicle to pedestrian collision
  - Eastbound travel direction
  - Stop-controlled intersection
- Chalan Monsignor Guerrero & Rayao Loop:
  - Vehicle to vehicle collision (rear-end)
  - Eastbound travel direction of primary vehicle
  - Stop-controlled intersection
- Beach Road, on the roadway approximately 225-feet south of Ghili Street
  - Single vehicle collision
  - Northbound travel direction

Collisions at Intersections

Figure 3-28 presents the total collisions at study intersections as well as thirteen additional intersection locations on the highway system. Table 3.21 presents the intersections with the highest number of total collisions that occurred in 2017, three of which are study intersections.

Table 3.22 presents the number of collisions that occurred at each study intersection during the 2017 data period, categorized further into fatal, injury, and non-injury collisions. As presented in

Table 3.22, the study intersections with the highest collision frequency in 2017 were Beach Road & Quartermaster Road, Beach Road & Garapan Street, and Beach Road & Chalan Monsignor Guerrero.

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Table 3.21 Top Intersection Collision Locations on Highway Network

Intersection	2017 Collisions	
	Total	Study Intersection?
Beach Road & Quartermaster Road	**33**	Yes
Beach Road & Orchid Street	**20**	-
As Perdido Road & Beach Road	**19**	-
Beach Road & Grapan Street	**18**	-
Beach Road & Hibiscus Street	**18**	-
Chalan Monsignor Guerrero & Kannat Tabla Drive	**18**	-
Beach Road & Bwughos Street	**17**	-
Beach Road & Chalan Monsignor Guerrero	**16**	Yes
Chalan Monsignor Guerrero & Chalan Pale Arnold	**16**	Yes
Coral Treet Avenue & Palm Street	**13**	-
Alahai Avenue & Grapan Street	**12**	-
Beach Road & Insatto Street	**12**	-
Chalan Pale Arnold & Grapan Street	**12**	-
Chalan Pale Arnold & Gualo Rai Road	**12**	-
Beach Road & Susupe Street	**11**	-
Chalan Pale Arnold & Espana Street	**11**	-

Table 3.22 Collisions at Study Intersections by Severity

#	Intersection	Control Type[1,2]	2017 Collisions			
			Total	Non-Injury	Injury	Fatal
1	Beach Rd & Micro Beach Rd	AWSC	**4**	4	-	-
2	Route 30 (Middle Road/Chalan Pale Arnold) & Navy Hill Rd	Signal	**0**	-	-	-
3	Beach Rd & CPL Derence Jack Rd	TWSC	**0**	-	-	-
4	Beach Rd & Gualo Rai Rd	TWSC	**4**	3	1	-
5	Beach Rd & Quartermaster Rd	TWSC	**30**	21	9	-
6	Beach Rd & Route 31 (Chalan Monsignor Guerrero)	Signal	**15**	15	-	-
7	Route 30 (Middle Road/Chalan Pale Arnold) & Route 31 (Chalan Monsignor Guerrero)	Signal	**14**	12	2	-

Notes:

1. AWSC = All Way Stop Control; TWSC = Two Way Stop Control

Collision Types (Motor Vehicle Involved With)

Table 3.23 summarizes the collision data based on the type of objects or vehicles involved in the collision, and compares 2017 data to the collision data presented in the previous 2008 report, spanning 2003 to 2008. As presented in Table 3.23, for the 2017 dataset, collisions between multiple motor vehicles were the most common type of reported collision, followed by collisions with fixed objects, vehicle overturning, and collisions with non-fixed objects.

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Table 3.23 Collisions by Motor Vehicle Involved With

Motor Vehicle Involved With	2017 Collisions		2003-2008 Collisions*	
	Total	%	Total	%
Motor Vehicle	1,630	72.2%	6,431	72.1%
Fixed Object	60	2.7%	623	7.0%
Non-Fixed Object	23	1.0%	-	-
Pedestrian	20	0.9%	141	1.6%
Pedalcycle	2	0.1%	-	-
Animal	8	0.4%	59	0.7%
Overturned	26	1.2%	39	0.4%
Ran Offroad	7	0.3%	667	7.5%
Other/Unknown/Unreported	483	21.4%	-	-
SAIPAN TOTAL	**2,259**	**100%**		

**The collision "Motor Vehicle Involved With" attribute was recorded with different categories for the 2003-2008 data. The nearest matches are shown for comparison to the 2017 collision dataset.*

3.8.1 Collision Frequency and Rates

Table 3.24 presents the number of collisions that occurred along each study roadway segment during the 2017 data period, categorized further into fatal, injury, and non-injury collisions. These totals include collisions that occurred at intersections along the study roadway segments.

Five fatal collisions occurred in 2017 on CNMI highways at the following locations:

- **1 fatal collision:** Route 33 (Beach Road), between Chalan Monsignor Guerrero to Chalan Hagoi
- **1 fatal collision:** Route 30 (Middle Road/Chalan Pale Arnold), between Isa Drive to Micro Beach Road
- **3 fatal collisions:** Route 31 (Chalan Monsignor Guerrero), between Middle Road/Chalan Pale Arnold to Chalan Msgr. Martinez

In addition, collision rates were calculated for each study segment using the Federal Highway Administration (FHWA) collision rate[1] for both total and fatal + injury collisions. The study segments with the highest rate for either total or fatal + injury collisions are highlighted in in the following table. Collision rates are helpful in comparing study segments to each other, as the rates take into account both segment length and daily volume to account for variations in study segments.

As presented in Table 3.24 several segments along Route 33 (Beach Road), Route 30 (Middle Road/Chalan Pale Arnold), and Chalan Monsignor Guerrero made up the highest collision frequency locations. However, Garapan Street has the highest collision rate with a length of 1,370-feet with 19 total and 3 injury collisions.

Collision rates for both total and fatal + injury collisions are presented on Figure 3-29 and Figure 3-30, respectively.

[1] https://safety.fhwa.dot.gov/local_rural/training/fhwasa1109/app_c.cfm

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Table 3.24 Collisions on Study Road Segments by Severity

			2017 Collisions				Total Collision Rate	Fatal + Injury Collision Rate
Study Segment	Road Name	Location	Total	Non-Injury	Injury	Fatal	Rank	Rank
S-1	Beach Road	Mircro Beach to Garapan St.	**87**	84	3	-	3	17
S-2	Beach Road	Garapan St. to Gualo Rai Rd.	**76**	65	11	-	7	6
S-3	Beach Road	Gualo Rai Rd. to Quartermaster Rd.	**39**	34	5	-	22	20
S-4	Beach Road	Quartermaster Rd. to Chalan Monsignor Guerrero	**26**	24	2	-	31	26
S-5	Beach Road	Chalan Monsignor Guerrero to Chalan Hagoi	**157**	137	19	1	12	11
S-6	Beach Road	Chalan Hagoi to As Perdido Rd.	**59**	54	5	-	10	15
S-7	Beach Road	As Perdido Rd. to Afetna Rd.	**0**	-	-	-	38	27
S-8	Beach Road	Afetna Rd. to Koblerville Rd.	**0**	-	-	-	38	27
S-9	Middle Road/Chalan Pale Arnold	North end to As Matius Road	**14**	14	-	-	13	27
S-10	Middle Road/Chalan Pale Arnold	As Matius Road to Isa Drive	**43**	38	5	-	19	22
S-11	Middle Road/Chalan Pale Arnold	Isa Drive to Micro Beach Road	**38**	31	6	1	32	19
S-12	Middle Road/Chalan Pale Arnold	Micro Beach Road to Gualo Rai Road	**129**	114	15	-	8	8
S-13	Middle Road/Chalan Pale Arnold	Gualo Rai Road to Quartermaster Road	**86**	72	14	-	9	4
S-14	Middle Road/Chalan Pale Arnold	Quartermaster Road to Chalan Monsignor Guerrero	**37**	33	4	-	25	23
S-15	Chalan Monsignor Guerrero	Beach Road to Middle Road/Chalan Pale Arnold	**6**	6	-	-	35	27
S-16	Chalan Monsignor Guerrero	Middle Road/Chalan Pale Arnold to Chalan Msgr. Martinez	**75**	63	9	3	18	14
S-17	Chalan Monsignor Guerrero	Tun Herman Pan Road to DanDan Road	**2**	2	-	-	37	27
S-18	Tun Herman Pan Road	Chalan Msgr Guerrero to Flame Tree Road	**10**	8	2	-	23	13
S-19	Tun Herman Pan Road	Flame Tree Road to Airport	**8**	7	1	-	29	24
S-20	Isa Drive	Middle Road/Chalan Pale Arnold to Capitol Hill Road	**11**	10	1	-	34	25
S-21	Isa Drive	Capitol Hill Road to DanDan Road	**66**	57	9	-	20	18
S-22	DanDan Road	Chalan Monsignor Guerrero to Flame Tree Road	**18**	11	7	-	28	3
S-23	Flame Tree Road	DanDan Road to Tun Herman Pan Rd.	**2**	1	1	-	36	9
S-24	Flame Tree Road	Tun Herman Pan Road to As Perdido Road	**7**	7	-	-	11	27

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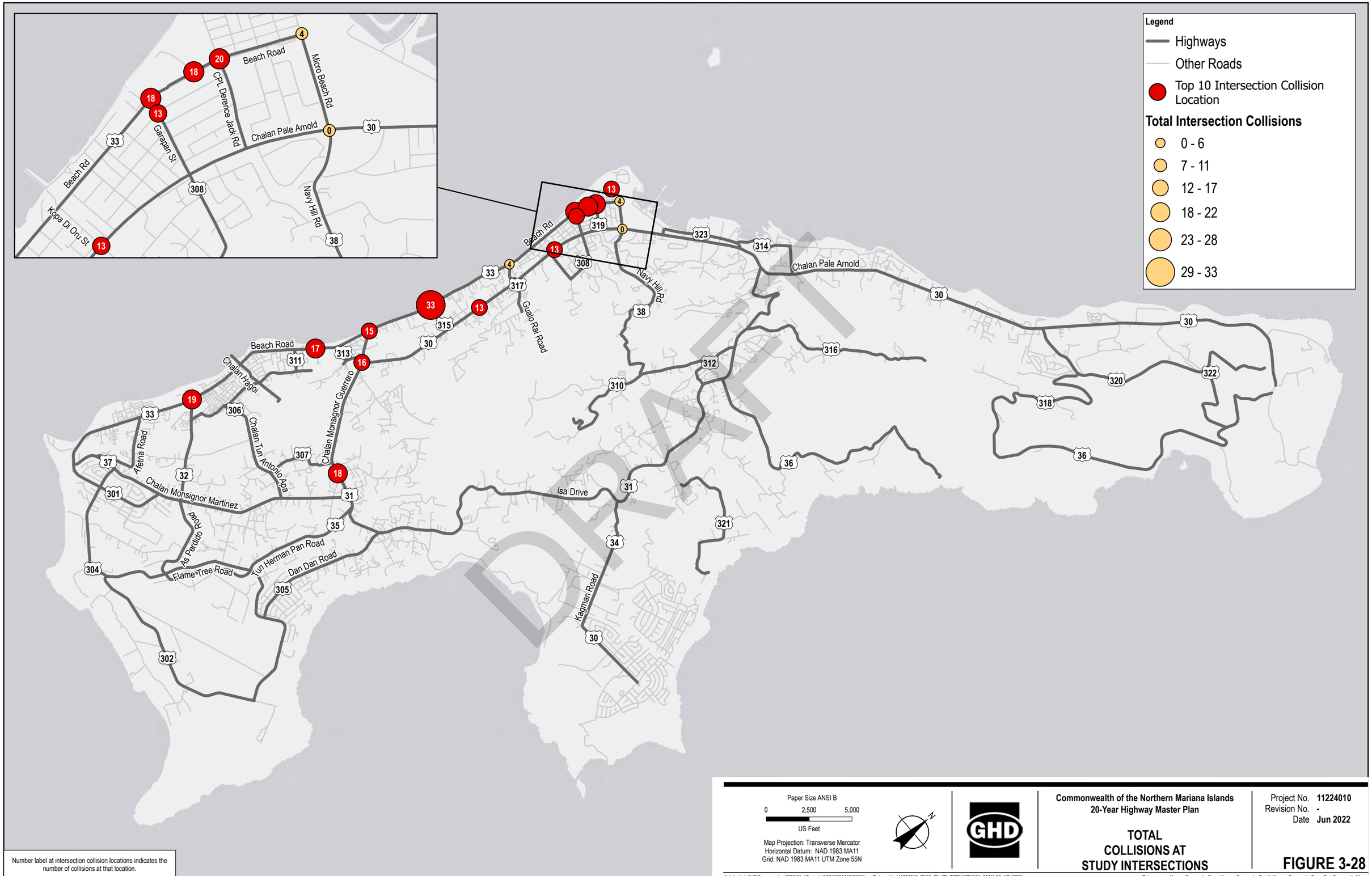
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			2017 Collisions				Total Collision Rate	Fatal + Injury Collision Rate
Study Segment	Road Name	Location	Total	Non-Injury	Injury	Fatal	Rank	Rank
S-25	Chalan Monsignor Martinez	Chalan Monsignor Guerrero to Chalan Tun Joaquin Doi	**16**	14	2	-	17	16
S-26	Chalan Monsignor Martinez	Chalan Tun Joaquin Doi to Beach Road	**50**	43	7	-	14	10
S-27	As Perdido Road	Beach Road to Chalan Monsignor Martinez	**26**	23	3	-	6	7
S-28	As Perdido Road	Chalan Monsignor Martinez to Tun Herman Pan Rd/Flame Tree Rd	**6**	5	1	-	30	21
S-29	Gualo Rai Road	east of Beach Road	**4**	4	-	-	2	27
S-30	Quartermaster Road	east of Beach Road	**2**	2	-	-	24	27
S-31	Chalan Tun Antonio Apa	Chalan Monsignor Guerrero to Chalan Tun Joaquin Doi	**20**	16	4	-	15	5
S-32	Kopa Di Oru Street	east of Beach Road	**1**	1	-	-	26	27
S-33	Garapan Street	east of Beach Road	**19**	16	3	-	1	1
S-34	CPL Derence Jack Road	east of Beach Road	**0**	-	-	-	38	27
S-35	Micro Beach Road	east of Beach Road	**10**	6	4	-	5	2
S-36	Afetna Road	east of Beach Road	**12**	12	-	-	4	27
S-37	Navy Hill Road	east of Middle Road/Chalan Pale Arnold	**8**	8	-	-	33	27
S-38	Oleai Street	east of Beach Road	**1**	1	-	-	21	27
S-39	Tekken Street	east of Beach Road	**0**	-	-	-	38	27
S-40	Chalan Hagoi	east of Beach Road	**7**	7	-	-	16	27
S-41	Kagman Road		**21**	16	5	-	27	12

Note: Values in columns are shaded according to their respective ranking compared to all study roadway segments, where dark red represents worse conditions.

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Number label at intersection collision locations indicates the number of collisions at that location.

Paper Size ANSI B

0 2,500 5,000

US Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

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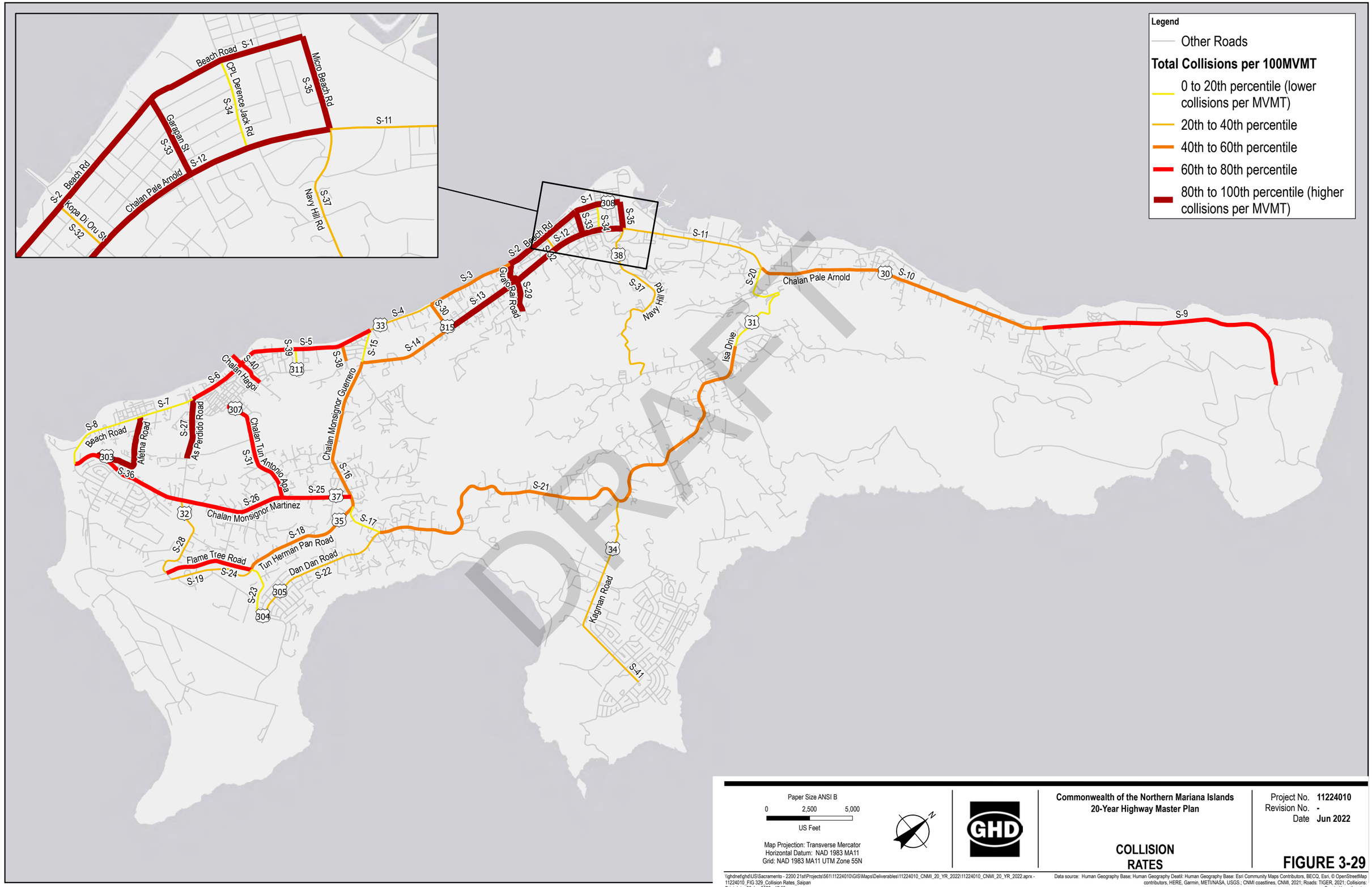
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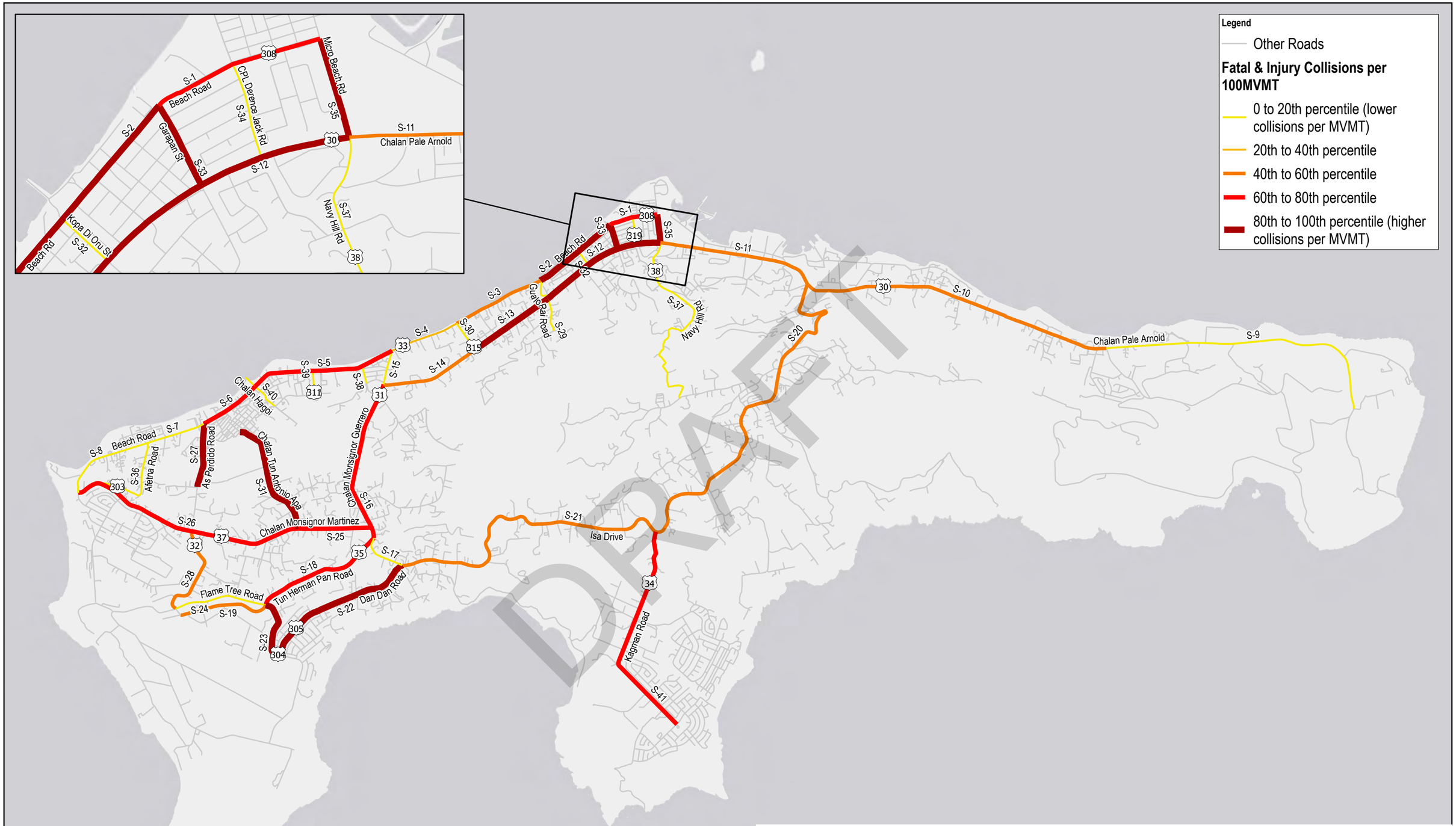
Project No. **11224010**
Revision No. **-**
Date **Jun 2022**

FIGURE 3-28

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Data source: Human Geography Base; Human Geography Deatil: Human Geography Base: Esri Community Maps Contributors, BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, METI/NASA, USGS.; CNMI coastlines, CNMI, 2021; Roads: TIGER, 2021; Collisions: CNMI, 2017.
Created by: pthornton


Legend
Other Roads
Total Collisions per 100MVMT
0 to 20th percentile (lower collisions per MVMT)
20th to 40th percentile
40th to 60th percentile
60th to 80th percentile
80th to 100th percentile (higher collisions per MVMT)
Beach Road
S-1
CPL Derence Jack Rd
Micro Beach Rd
S-35
S-34
Garapan St
S-33
S-12
S-11
S-2
Beach Rd
Chalan Pale Arnold
Kopa Di Oru St
S-32
Navy Hill Rd
S-37
308
38
S-3
S-4
S-5
S-6
S-7
S-8
S-10
S-9
S-20
S-21
S-13
S-29
Guajan Rai Road
S-30
315
33
S-39
311
S-40
S-38
S-15
S-14
Chalan Monsignor Guerrero
Chalan Hagoi
307
Beach Road
Afetna Road
As Percido Road
S-27
303
S-36
Chalan Tun Antonio Apa
S-31
S-16
S-25
37
S-26
Chalan Monsignor Martinez
32
35
S-17
S-18
S-28
Flame Tree Road
Tun Herman Pan Road
Dan Dan Road
S-19
S-24
S-22
S-23
305
304
Navy Hill Rd
Isa Drive
31
30
34
Kagman Road
S-41
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Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N
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20-Year Highway Master Plan
COLLISION RATES
Project No. 11224010
Revision No. -
Date Jun 2022
FIGURE 3-29
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Created by: pthornton



Paper Size ANSI B

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US Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

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Date **Jun 2022**

FATAL & INJURY COLLISION RATES

FIGURE 3-30

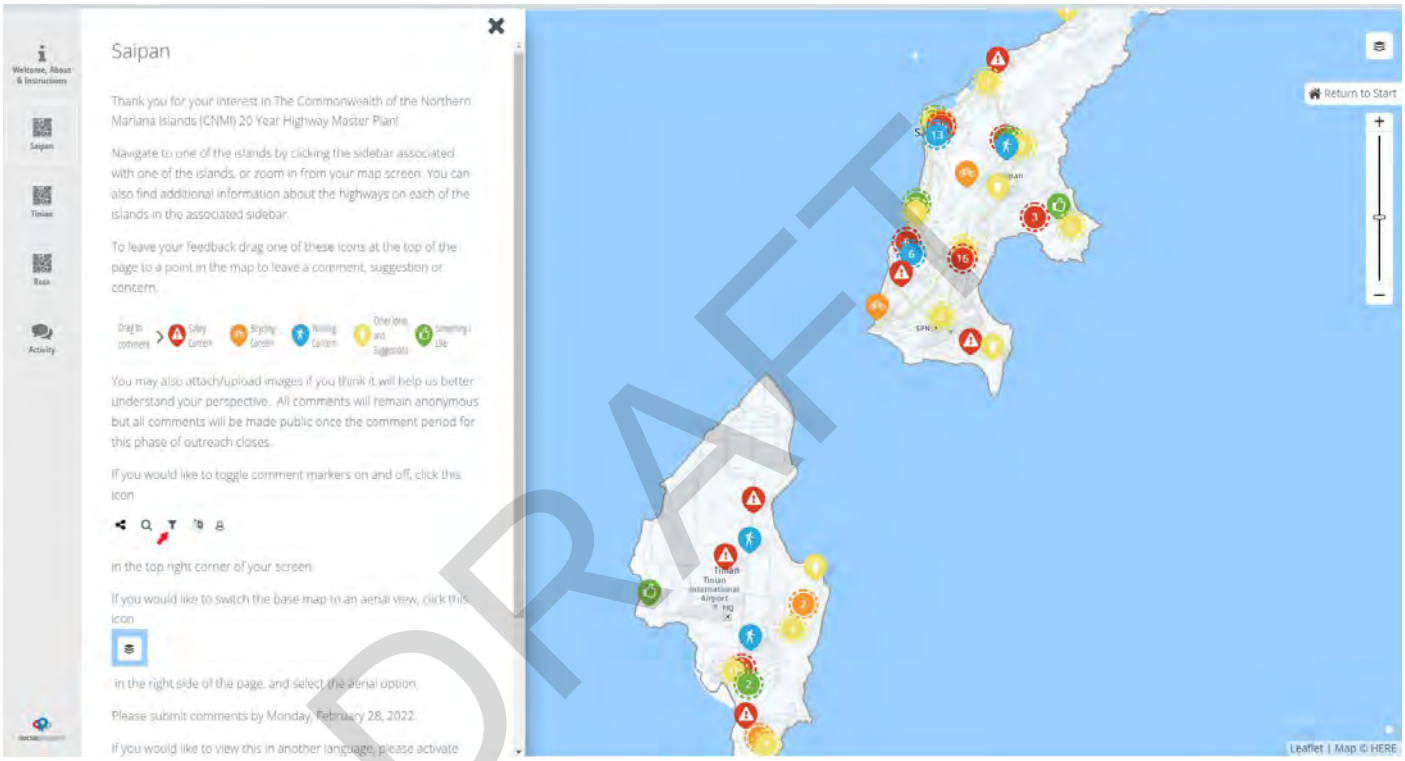
\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_FIG 330_Fatal + Injury Collision Rates_Saipan
Print date: 29 Jun 2022 - 18:00

Data source: Human Geography Base; Human Geography Deatil: Human Geography Base: Esri Community Maps Contributors, BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, METI/NASA, USGS.; CNMI coastlines, CNMI, 2021; Roads: TIGER, 2021; Collisions:
Created by: pthornton

4 Public Input

A Project website[2] was created, hosted on the Social Pinpoint platform, which provided Project background and goals, an informational video recorded by GHD and DPW staff, listed upcoming workshops with location details for in-person and virtual participation via Zoom. and provided an interactive map that allowed users to pin their comments to a location on Saipan, Tinian, or Rota. These comments were assigned tags based on keywords found in the text of the comment (e.g. comments containing the word “walking” or “crosswalk” were assigned the Pedestrian tag). The comment submission period lasted from July 31, 2021 to February 28, 2022, during which time a total of 224 comments were recorded on the Project website.

Figure 4-1 Online Interactive Comment Map



4.1 Workshops

Public workshops were held in early 2022 on each of Rota (January 26), Tinian (February 2), and Saipan (February 10). The public workshops were advertised on social media and in the local newspapers of the Marianas Variety and the Saipan Tribune including a QR code that linked to the Project website. Each meeting included an informational presentation covering the purpose of the Highway Master Plan, study components, and review of previous public input received electronically, as well as a forum for comments, questions, and suggestions for highway system improvements. This section summarizes the community feedback received from these meetings, as well as the comments received on the Project website.

[2] https://cnmihighwaymasterplan.mysocialpinpoint.com/

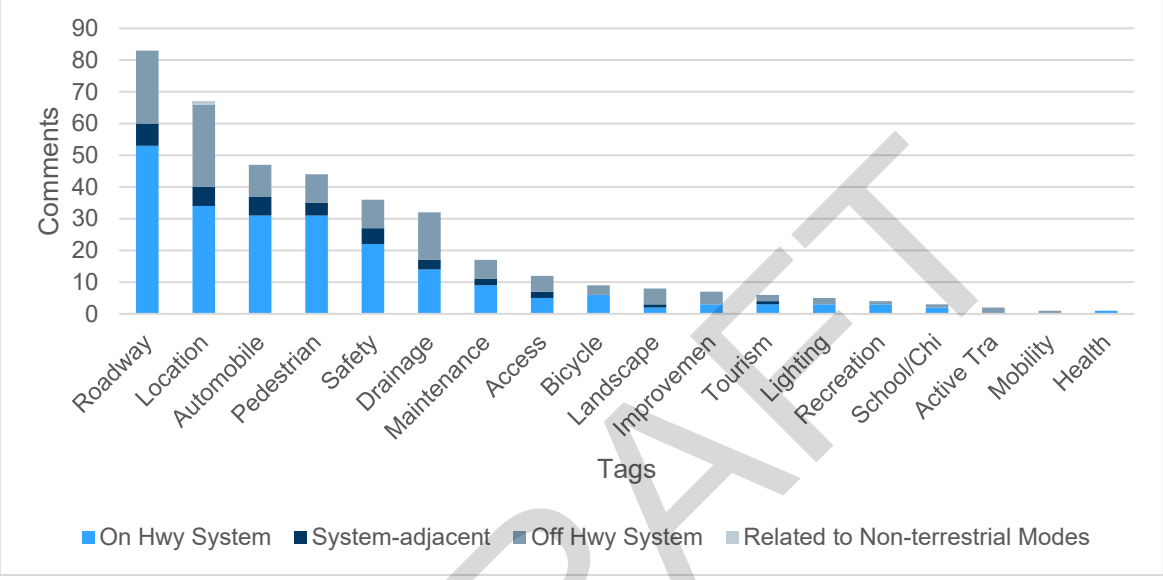
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4.2 Online Input

Saipan

A total of 161 comments were pinned on the island of Saipan. Of these, 97 were pinned on roadways that are part of the highway system. Figure 4-2 presents a summary of Saipan comments assigned each tag. Note that one comment can be assigned multiple tags. Comments categorized as On the Highway System were those pinned directly on a roadway or sidewalk facility within the highway system. Comments categorized as System Adjacent were those pinned on a property fronting a road within the highway system, or pinned on a side street near where it crosses the highway route.

Figure 4-2 Saipan Comments by Tag & Location Type



As presented in Figure 4-2, the tags assigned to the most Saipan comments were Roadway (67 comments), Location (47), and Automobile (44 comments).

Among the comments received for Saipan, repeated concerns included:

– Limited walking and biking access on roadways and intersections in Garapan
– Concerns about pedestrians along Middle Road/Chalan Pale Arnold having to walk in close proximity to vehicle traffic
– Traffic congestion experienced at the intersection of Beach Road & Chalan Monsignor Guerrero
– Rain events causing flooding, eroded ruts, and sediment buildup on various roadways on Saipan

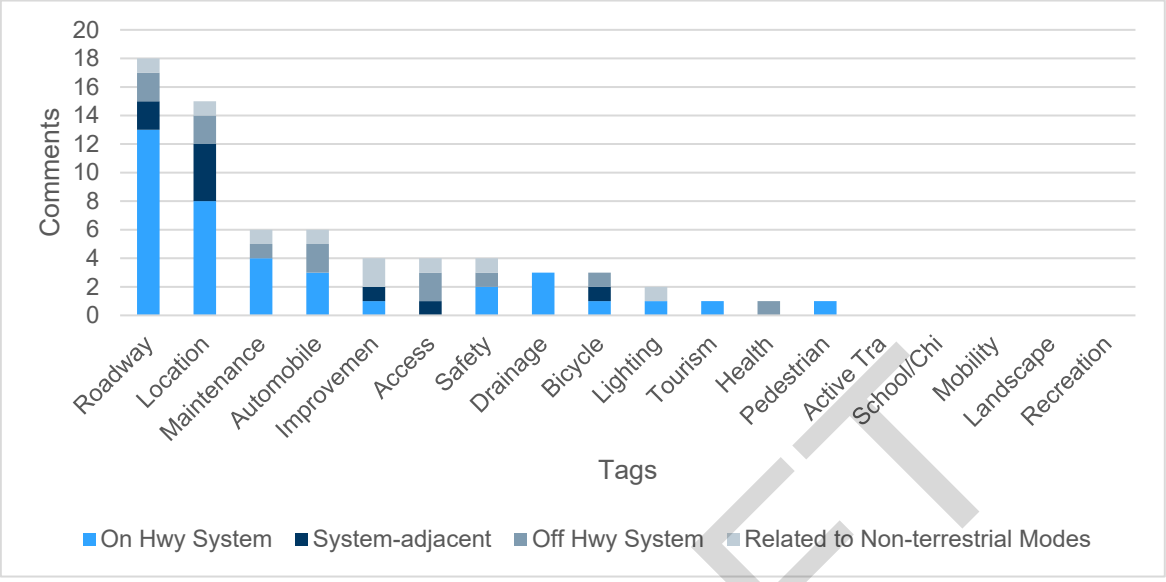
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Tinian

A total of 46 comments were pinned on the island of Tinian. Of these, 30 were pinned on roadways that are part of the highway system. Figure 4-3 presents a summary of Tinian comments assigned each tag.

Figure 4-3 Tinian Comments by Tag & Location Type



As presented in Figure 4-3, the tags assigned to the most Tinian comments were Roadway (18 comments), Location (15), Maintenance (6 comments), and Automobile (6 comments).

Among the comments received for Tinian, repeated concerns included:

– Vegetation overgrowth on Route 27 limiting usable roadway width and creating hazardous driving conditions
– Sight distance concerns at the Broadway and Canal Street roundabout
– Limited walking access in developed areas, including the Marpo Heights expansion
– Potholes and drainage issues along Broadway

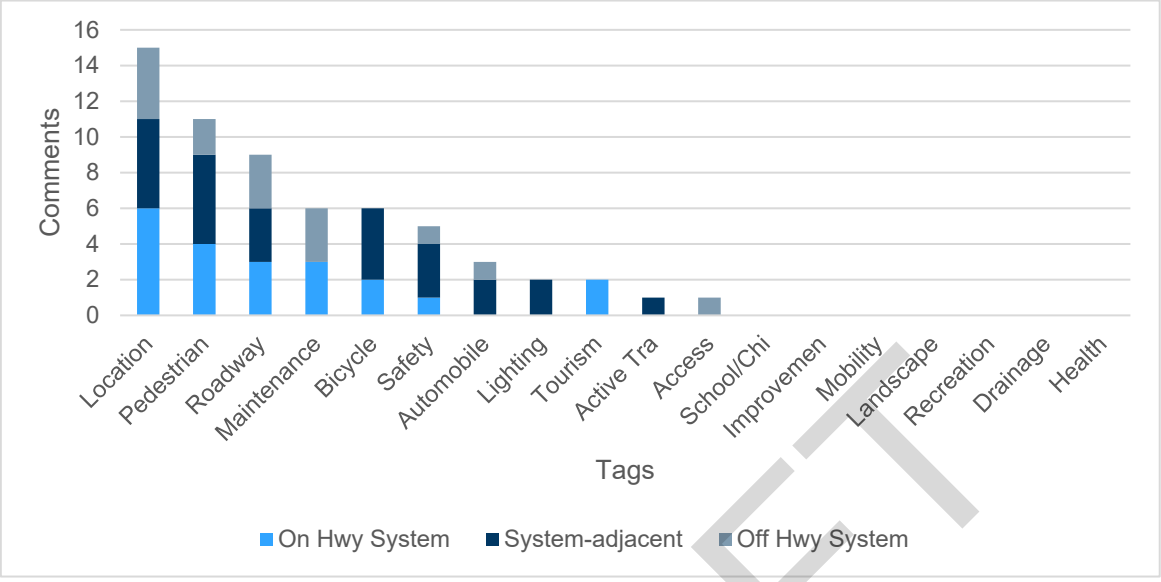
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Rota

A total of 17 comments were pinned on the island of Rota. Of these, 7 were pinned on roadways that are part of the highway system. Figure 4-4 presents a summary of Rota comments assigned each tag.

Figure 4-4 Rota Comments by Tag & Location Type



As presented in Figure 4-4, the tags assigned to the most Rota comments were Location (15 comments), Pedestrian (11), Roadway (9 comments).

Among the comments received for Rota, repeated concerns included:

– Difficulty travelling along coastal highways for pedestrians and bicyclists
– Sheer slopes close to the edge of Route 100
– Desire for pedestrian and bike facilities to increase access between developed areas of the island
– Potholes and encroaching plant growth along Ginalangan Road creating hazardous driving conditions

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4.2.1 Public Input on Multimodal Needs

According to the public outreach effort for this plan, the following highways should be further evaluated for improved pedestrian infrastructure, including sidewalk, crosswalks, and lighting, highlighted in orange on the following maps. In addition, the following roadways should be further evaluated for improved bicycle infrastructure, including bike lanes, or widened shoulders, highlighted in blue on the following maps.

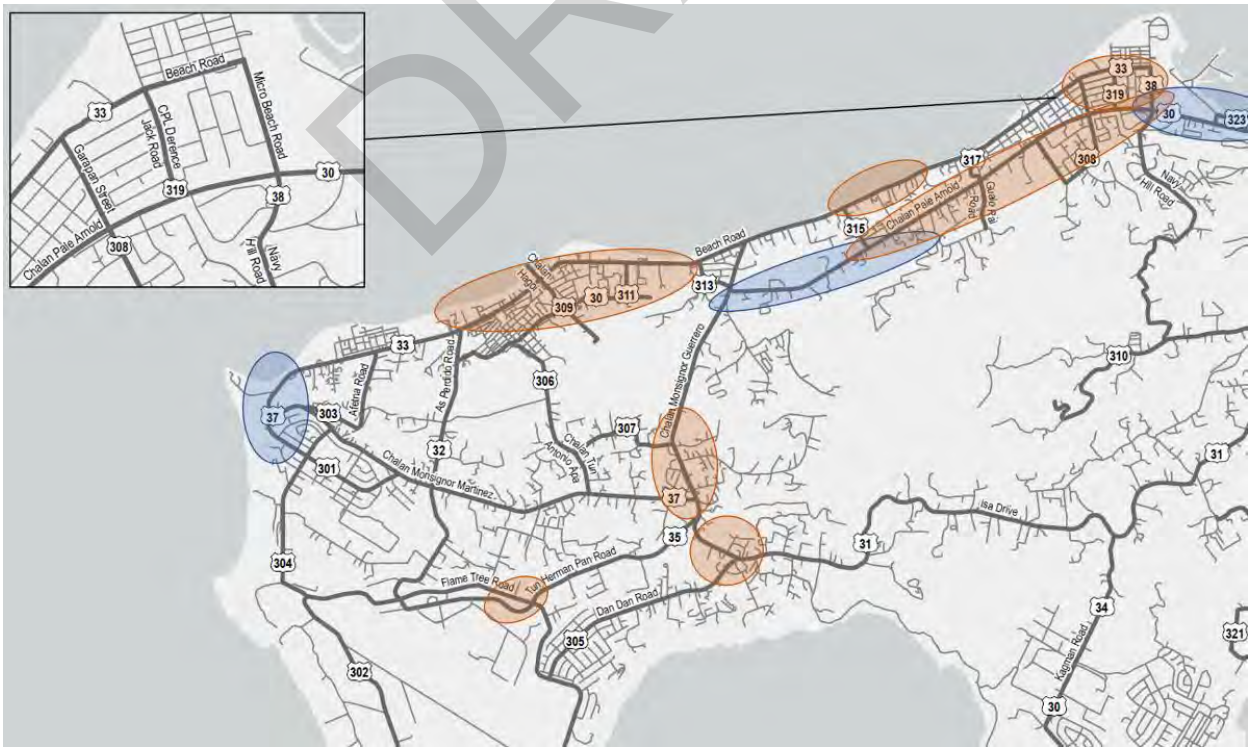
Note: The illustrations below reflect the opinion of those members of the public that participated in the online mapping tool as part of this planning process.

Saipan

– Pedestrian (Orange):
  - Route 31 (Chalan Monsignor Guerrero), specifically near Chalan Monsignor Martinez
  - Route 33 (Beach Road), entire extent
  - Route 30 (Middle Road/Chalan Pale Arnold), specifically from Quartermaster Road to the port on Industrial Drive
  - Route 304 (Flame Tree Road), near the airport field
  - Route 31 (Isa Drive), east of Chalan Tun Harman Pan, to connect to the park
  - Route 31 (Isa Drive), entire extent
  - Route 30 (Middle Road/Chalan Pale Arnold/Middle Road/Chalan Pale Arnold), to the north

– Bicycle (Blue):
  - Route 30 (Middle Road/Chalan Pale Arnold/Middle Road/Chalan Pale Arnold), to connect villages in the North and the South of Saipan
  - Route 33 (Beach Road), southern segments
  - Route 30 (Middle Road/Chalan Pale Arnold/Middle Road/Chalan Pale Arnold), to the north

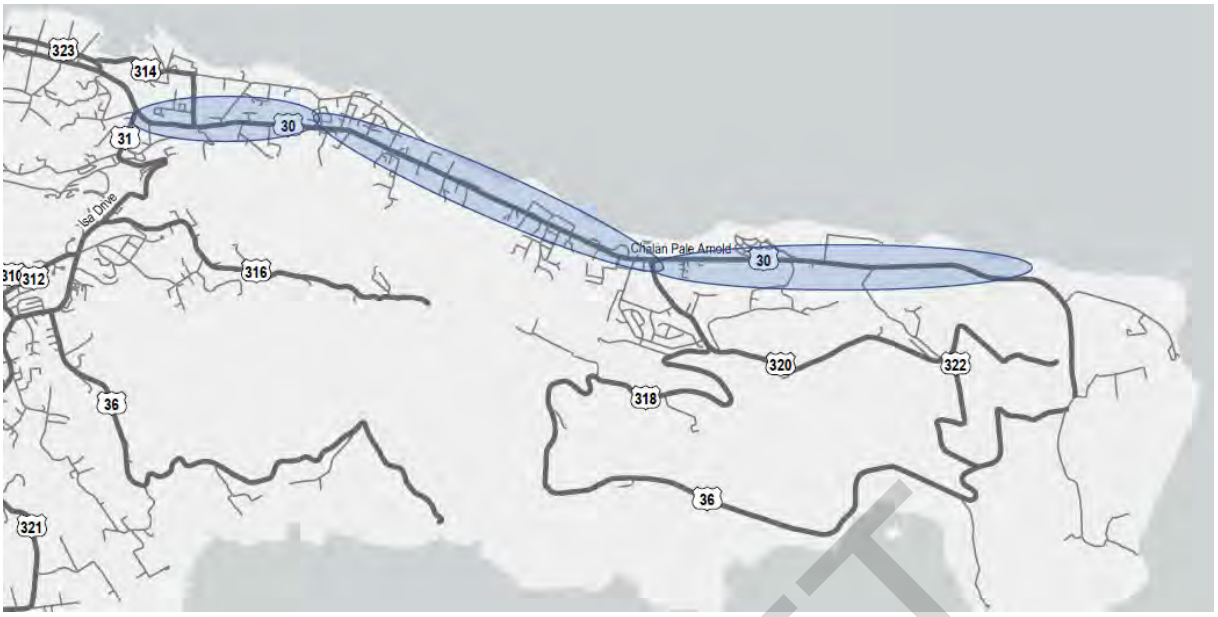
Illustration 4-1 Saipan (South) Pedestrian & Bicycle Public Comment Areas



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Illustration 4-2 Saipan (North) Bicycle Public Comment Areas



Tinian

– Pedestrian (Orange):
  - Route 21 (Broadway) near Wall Street
  - Route 21 (Broadway) near 86th Street
– Bicycle (Blue):
  - Route 27, southern segment (Comments were made for connections to the highway via non-highway roads)
  - Route 20 (Comments were made for connections to the highway via non-highway roads)

Illustration 4-3 Tinian Pedestrian & Bicycle Public Comment Areas



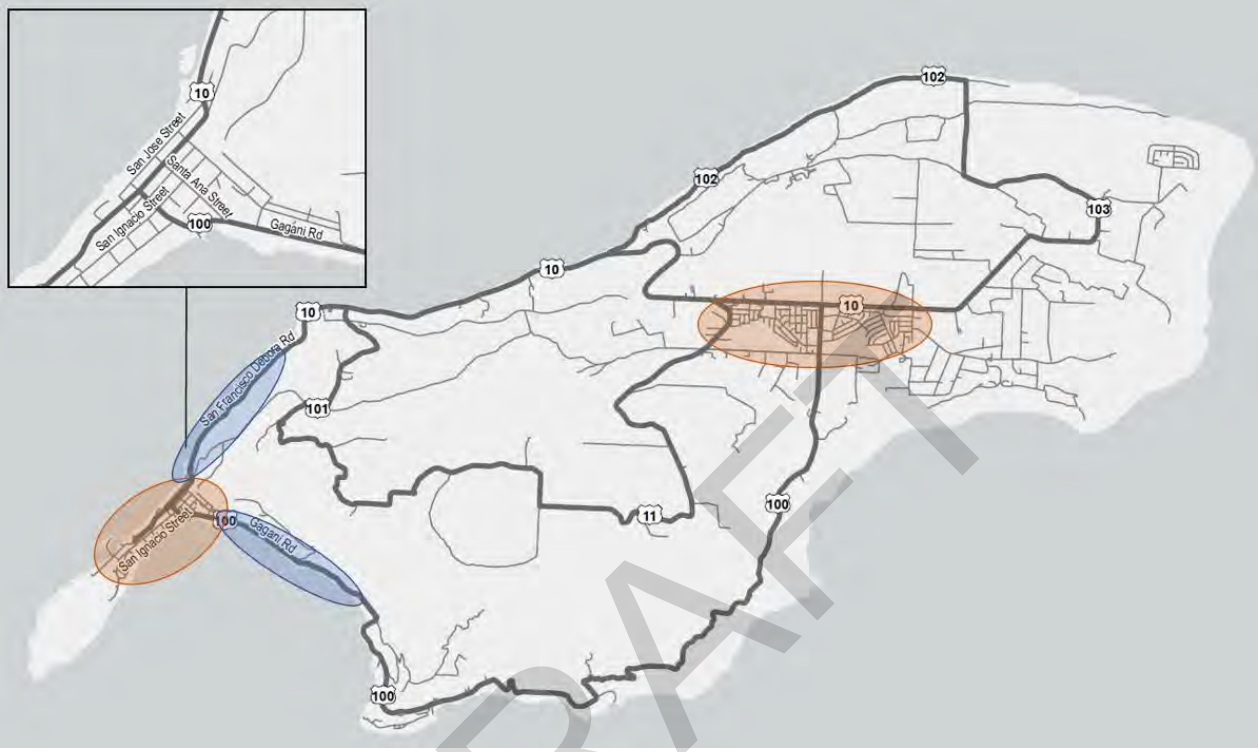
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Rota

– Pedestrian (Orange) & Bicycle (Blue):
  - Primarily in SongSong Village and Sinapalo Village
  - General comments for sidewalks and bicycle lanes throughout the island

Illustration 4-4 Rota Pedestrian & Bicycle Public Comment Areas



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5 Long-Term Transportation Conditions

5.1 Long-Term (2040) Traffic Volumes

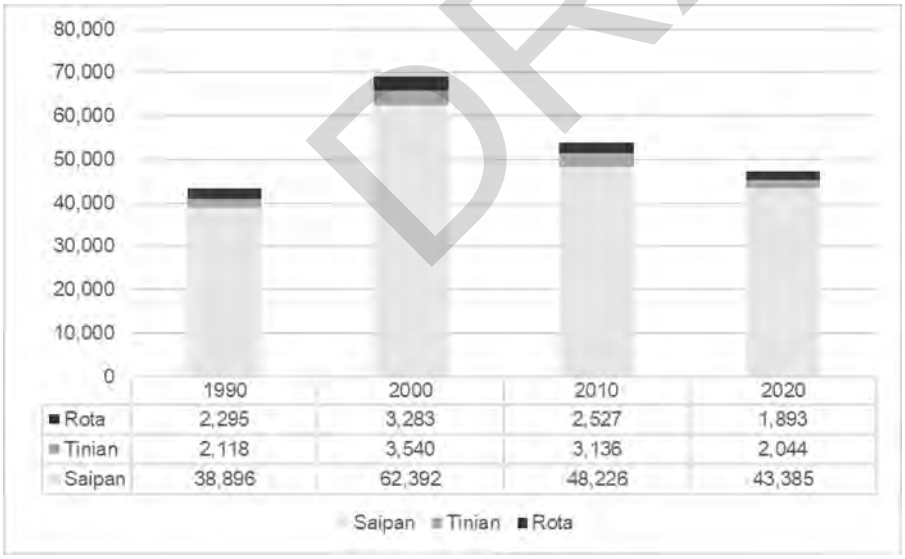
The Highway Master Plan identifies long-term transportation improvements to address deficiencies and constraints anticipated to occur over the next twenty years or beyond. Future transportation conditions assume planned roadway improvements are in place and traffic volumes have been grown to reflect approximately twenty years of change associated with anticipated fluctuations in population, employment, and tourism. To forecast Long-Term (2040) traffic volumes, the Near-Term Recovery Conditions traffic volume estimates were grown by an annual growth factor and analyzed using the same operational analysis methodology utilized for Near-Term Recovery Conditions for study roadways and intersections. The following provides a summary of the assumptions and methodology used to forecast Long-Term (2040) traffic volumes.

The previous 2008 Highway Master Plan utilized a growth rate of 2-percent per year to grow traffic volumes for study intersection and roadway locations. This growth rate was derived from both historic average daily traffic volumes from Saipan and population data from all three islands. Lacking enough historical traffic data to confidently identify a trend in growth beyond near-term conditions, population was determined to be the most reliable and available proxy to use as the basis for estimating an annual growth rate to forecast traffic volumes.

Population Trends & Projections

Historical population values reported through the US Census over the past 20-Years show a decrease in total population for Saipan, Tinian, and Rota, with a 30-percent decrease in population on Saipan and a 42-percent decrease in population on both Tinian and Rota between 2000 and 2020 (see Figure 5-1). Several world events between 2000 and 2020 may have contributed to the declining trend seen in Figure 5-1, including 9-11 in 2001, outbreak of SARS in 2003, withdrawal of Japan Airlines in 2005, global economic crisis in 2009, several seismic events, typhoons, and the on-going Global COVID-19 pandemic.

Figure 5-1 Island Population (1990 – 2020)



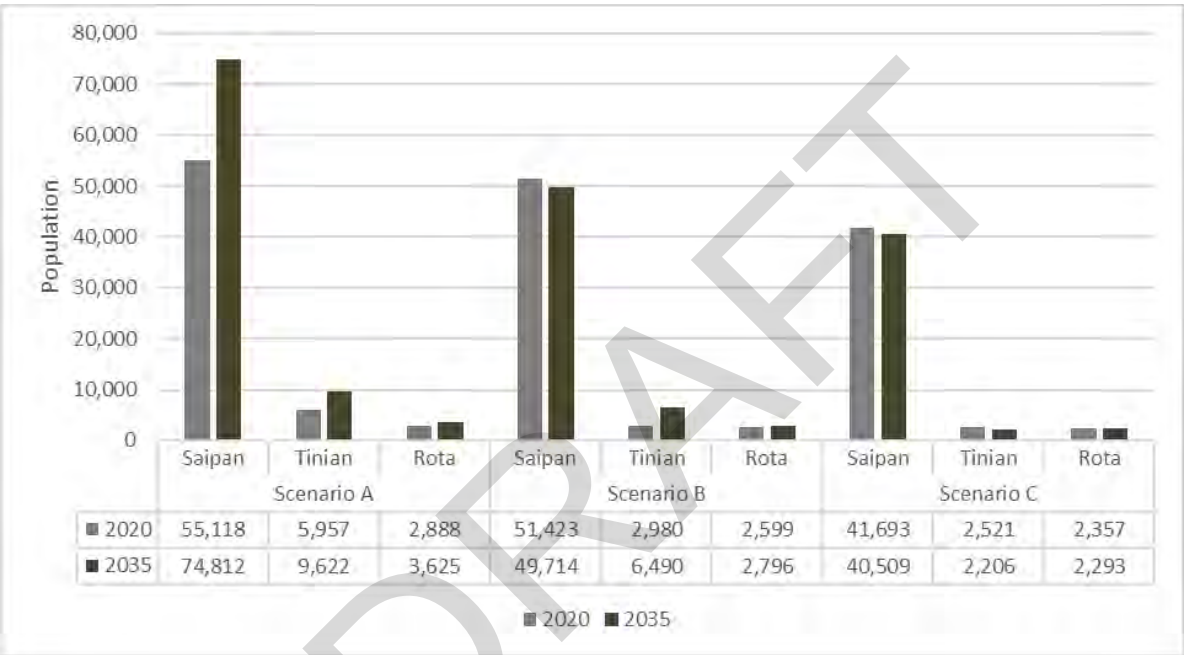
Although historical population trends suggest a continued decline into the future, other factors, such as varying degrees of land use development on the islands, are anticipated to affect growth trends over the next twenty years. Population growth projections published in the March 2019 CNMI Comprehensive Public Land Use Plan Update (Public Land Use Plan, DPL Report) reflect varying degrees of development with corresponding ranges of anticipated

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population growth between years 2020 and 2035 (see Figure 5-2). These projections are represented within the following three scenarios:

- Scenario A is the high estimate derived from the optimistic estimates found in the 2017 publication *Tourism Development in the US Commonwealth of the Northern Mariana Islands: A Feasibility & Sustainability Study* developed by consultants Horwath HTL for the Marianas Visitors Authority (MVA), assuming buildout of several hotels and casinos across the islands.
- Scenario B is medium growth, where Saipan remains with the current level of development so visitorship plateaus there, Tinian still gets a casino, and Rota adds one new hotel.
- Scenario C is the negative growth scenario, wherein the phase-out of CW-1 workers (a temporary working permit for non-US people to work in CNMI) disrupts the economy. Visitor arrivals on Saipan are assumed to drop then slightly recover. Rota and Tinian have minimal development.

Figure 5-2 DPL Island Population Projections (2020 – 2035)



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Highway Master Plan Growth Rates

The Public Land Use Plan Year 2020 population estimates were forecasted based on anticipated growth from Year 2018 and do not reflect actual population values. Actual Census reported Year 2020 population numbers per island were considerably lower than the Year 2020 estimates from the Public Land Use Plan. The lower-than-projected populations are likely attributable to recent economic factors, such as Delta's removal of flights to Saipan International Airport, the impact of multiple typhoons, and the COVID-19 pandemic. In lieu of using actual population projections published within the Public Land Use Plan, the growth rates were annualized and applied to actual Census reported Year 2020 population numbers per island to project Long-Term (2040) population estimates. The resulting growth rates per island per scenario are shown in the following table.

While each scenario has the potential to occur, scenario A land use development projections represent overly optimistic growth, especially when compared against the minimal growth represented in scenario C. To reach a more realistic forecast scenario, the calculated population growth rates between years 2020 and 2040 for scenarios A (the highest) and C (the lowest) were averaged to create the new scenario (Scenario D) to represent a conservatively high estimate in that it results in a positive growth rate despite the decrease between 2000 and 2020 Census population numbers and the aforementioned economic factors. Table 1.2 presents the average projected population estimates (Scenario D) and proposed 20-year annual growth rates by island.

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Table 5.1 Island Population Growth Rates

Scenario	DPL Report Estimates			Census Data	20-Year Growth* (Y)	Actual 2020 + 20-Year Growth (X+Y)	20-Year Annual Growth Rate
	2020	2035	15 Year Growth (2020 to 2035)	Actual 2020 (X)			
Scenario A							
Saipan	55,118	74,812	19,694	43,385	26,259	69,644	3.0%
Tinian	5,957	9,622	3,665	2,044	4,887	6,931	12.0%
Rota	2,888	3,625	737	1,893	983	2,876	2.6%
Scenario B							
Saipan	51,423	49,714	-1,709	43,385	-2,279	41,106	-0.3%
Tinian	2,980	6,490	3,510	2,044	4,680	6,724	11.4%
Rota	2,599	2,796	197	1,893	263	2,156	0.7%
Scenario C							
Saipan	41,693	40,509	-1,184	43,385	-1,579	41,806	-0.2%
Tinian	2,521	2,206	-315	2,044	-420	1,624	-1.0%
Rota	2,357	2,293	-64	1,893	-85	1,808	0.0%

The resulting calculated annual growth rate for **Saipan is 1.42%** growth per year, for **Tinian is 5.46%** growth per year, and for **Rota is 1.19%** growth per year. This averaged growth rate is applied to Near-Term Recovery Condition roadway and intersection traffic volumes for Long-Term (2040) operational analysis for each island. To establish Long-Term (2040) roadway and intersection operational analysis, these annual growth rates are applied to the Near-Term Recovery Conditions traffic volume estimates, non-compounding, over twenty years.

Table 5.2 Highway Master Plan 20-Year Growth Rate

Scenario	Averages of Scenarios A & C			Census Data	20-Year Growth* (Y)	Actual 2020 + 20-Year Growth (X+Y)	20-Year Annual Growth Rate
	2020	2035	15 Year Growth (2020 to 2035)	Actual 2020 (X)			
Scenario D							
Saipan	48,406	57,661	9,255	43,385	12,340	55,725	**1.42%**
Tinian	4,239	5,914	1,675	2,044	2,233	4,277	**5.46%**
Rota	2,623	2,959	337	1,893	449	2,342	**1.19%**

5.2 Future Roadway Operations

Table 5.3 presents the Long-Term (2040) daily volume (see Figure 5-3 through Figure 5-6), estimated peak hour volume, and roadway LOS results (see Figure 5-7 through 5-10) for each study location, with segments operating at deficient LOS highlighted. As presented in this table the following study segments operate at deficient LOS (LOS E or F) during the PM peak hour under Long-Term (2040) conditions:

- S-2 Route 33 (Beach Road), Garapan Street to Gualo Rai Road
- S-3 Route 33 (Beach Road), Gualo Rai Road to Quartermaster Road
- S-4 Route 33 (Beach Road), Quartermaster Road to Route 31 (Chalan Monsignor Guerrero)
- S-5 Route 33 (Beach Road), Route 31 (Chalan Monsignor Guerrero) to Chalan Hagoi
- S-6 Route 33 (Beach Road), Chalan Hagoi to As Perdido Road
- S-8 Route 33 (Beach Road), Afetna Road to Koblerville Road
- S-12 Route 30 (Middle Road/Chalan Pale Arnold), Route 38 (Micro Beach Road) to Route 317 (Gualo Rai Road)
- S-13 Route 30 (Middle Road/Chalan Pale Arnold), Route 317 (Gualo Rai Road) to Route 315 (Quartermaster Road)

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Table 5.3 Long-Term (2040) Roadway Operations

ID	Route Name	Road Name	Location	Roadway Classification	PM Peak Volume	PM Peak LOS
S-1	Rte 33	Route 33 (Beach Road)	Micro Beach to Garapan Street	2-Lane Principal Arterial	1,300	D
S-2	**Rte 33**	**Route 33 (Beach Road)**	**Garapan Street to Gualo Rai Road**	**2-Lane Principal Arterial**	**1,890**	**F**
S-3	**Rte 33**	**Route 33 (Beach Road)**	**Gualo Rai Road to Quartermaster Road**	**2-Lane Principal Arterial**	**2,160**	**F**
S-4	**Rte 33**	**Route 33 (Beach Road)**	**Quartermaster Road to Route 31 (Chalan Monsignor Guerrero)**	**4-Lane Principal Arterial**	**2,910**	**E or F**
S-5	**Rte 33**	**Route 33 (Beach Road)**	**Route 31 (Chalan Monsignor Guerrero) to Chalan Hagoi**	**4-Lane Principal Arterial**	**3,560**	**E or F**
S-6	**Rte 33**	**Route 33 (Beach Road)**	**Chalan Hagoi to As Perdido Road**	**4-Lane Principal Arterial**	**3,560**	**E or F**
S-7	Rte 33	Route 33 (Beach Road)	As Perdido Road to Afetna Road	4-Lane Principal Arterial	2,270	C or better
S-8	**Rte 33**	**Route 33 (Beach Road)**	**Afetna Road to Koblerville Road**	**2-Lane Principal Arterial**	**1,770**	**F**
S-9	Rte 30	Route 30 (Middle Road/Chalan Pale Arnold)	North end to As Matius Road	2-Lane Principal Arterial	290	B or better
S-10	Rte 30	Route 30 (Middle Road/Chalan Pale Arnold)	As Matius Road to Route 31 (Isa Drive)	4-Lane Principal Arterial	1,250	C or better
S-11	Rte 30	Route 30 (Middle Road/Chalan Pale Arnold)	Route 31 (Isa Drive) to Route 38 (Micro Beach Road)	4-Lane Principal Arterial	3,530	C or better
S-12	**Rte 30**	**Route 30 (Middle Road/Chalan Pale Arnold)**	**Route 38 (Micro Beach Road) to Route 317 (Gualo Rai Road)**	**4-Lane Principal Arterial**	**4,170**	**E or F**
S-13	**Rte 30**	**Route 30 (Middle Road/Chalan Pale Arnold)**	**Route 317 (Gualo Rai Road) to Route 315 (Quartermaster Road)**	**4-Lane Principal Arterial**	**3,730**	**E or F**
S-14	Rte 30	Route 30 (Middle Road/Chalan Pale Arnold)	Route 315 (Quartermaster Road) to Route 31 (Chalan Monsignor Guerrero)	4-Lane Principal Arterial	1,640	C or better
S-15	Rte 31	Route 31 (Chalan Monsignor Guerrero)	Route 33 (Beach Road) to Route 30 (Middle Road/Chalan Pale Arnold)	4-Lane Principal Arterial	2,460	D
S-16	Rte 31	Route 31 (Chalan Monsignor Guerrero)	Route 30 (Middle Road/Chalan Pale Arnold) to Chalan Msgr. Martinez	4-Lane Principal Arterial	2,430	C or better
S-17	Rte 31	Route 31 (Chalan Monsignor Guerrero)	Tun Herman Pan Road to Route 305 (DanDan Road)	4-Lane Principal Arterial	1,790	C or better
S-18	Rte 35	Tun Herman Pan Road	Chalan Msgr Guerrero to Route 304 (Flame Tree Road)	2-Lane Minor Arterial	760	B or better
S-19	Rte 35	Tun Herman Pan Road	Route 304 (Flame Tree Road) to Airport	2-Lane Minor Arterial	1,070	B or better
S-20	Rte 31	Isa Drive	Route 30 (Middle Road/Chalan Pale Arnold) to Capitol Hill Road	2-Lane Principal Arterial	1,120	B or better
S-21	Rte 31	Isa Drive	Capitol Hill Road to Route 305 (DanDan Road)	2-Lane Principal Arterial	1,140	B or better
S-22	Rte 305	Route 305 (DanDan Road)	Route 31 (Chalan Monsignor Guerrero) to Route 304 (Flame Tree Road)	2-Lane Major Collector	1,300	B or better
S-23	Rte 304	Route 304 (Flame Tree Road)	Route 305 (DanDan Road) to Tun Herman Pan Road	2-Lane Major Collector	660	B or better
S-24	Rte 304	Route 304 (Flame Tree Road)	Tun Herman Pan Road to Route 32 (As Perdido Road)	2-Lane Major Collector	430	B or better
S-25	Rte 37	Route 37 (Chalan Monsignor Martinez)	Route 31 (Chalan Monsignor Guerrero) to Chalan Tun Joaquin Doi	2-Lane Minor Arterial	1,610	B or better
S-26	Rte 37	Route 37 (Chalan Monsignor Martinez)	Chalan Tun Joaquin Doi to Route 33 (Beach Road)	2-Lane Minor Arterial	1,220	B or better
S-27	Rte 32	Route 32 (As Perdido Road)	Route 33 (Beach Road) to Route 37 (Chalan Monsignor Martinez)	2-Lane Minor Arterial	1,680	B or better
S-28	Rte 32	Route 32 (As Perdido Road)	Route 37 (Chalan Monsignor Martinez) to Tun Herman Pan Rd/Flame Tree Rd	2-Lane Minor Arterial	790	B or better
S-29	Rte 317	Route 317 (Gualo Rai Road)	east of Route 33 (Beach Road)	2-Lane Major Collector	170	B or better
S-30	Rte 315	Quartermaster Road	east of Route 33 (Beach Road)	2-Lane Major Collector	700	B or better
S-31	Rte 307	Chalan Tun Antonio Apa	Route 31 (Chalan Monsignor Guerrero) to Chalan Tun Joaquin Doi	2-Lane Major Collector	1,020	B or better
S-32		Kopa Di Oru Street	east of Route 33 (Beach Road)	2-Lane Local	690	B or better
S-33	Rte 308	Garapan Street	east of Route 33 (Beach Road)	2-Lane Major Collector	1,110	B or better
S-34	Rte 319	CPL Derence Jack Road	east of Route 33 (Beach Road)	2-Lane Major Collector	660	B or better
S-35	Rte 38	Route 38 (Micro Beach Road)	east of Route 33 (Beach Road)	2-Lane Minor Arterial	790	B or better
S-36	Rte 303	Afetna Road	east of Route 33 (Beach Road)	2-Lane Minor Collector	520	B or better
S-37	Rte 38	Route 38 (Navy Hill Road)	east of Route 30 (Middle Road/Chalan Pale Arnold)	2-Lane Minor Collector	800	B or better
S-38		Oleai Street	east of Route 33 (Beach Road)	2-Lane Major Collector	600	B or better
S-39	Rte 311	Tekken Street	east of Route 33 (Beach Road)	2-Lane Major Collector	710	B or better

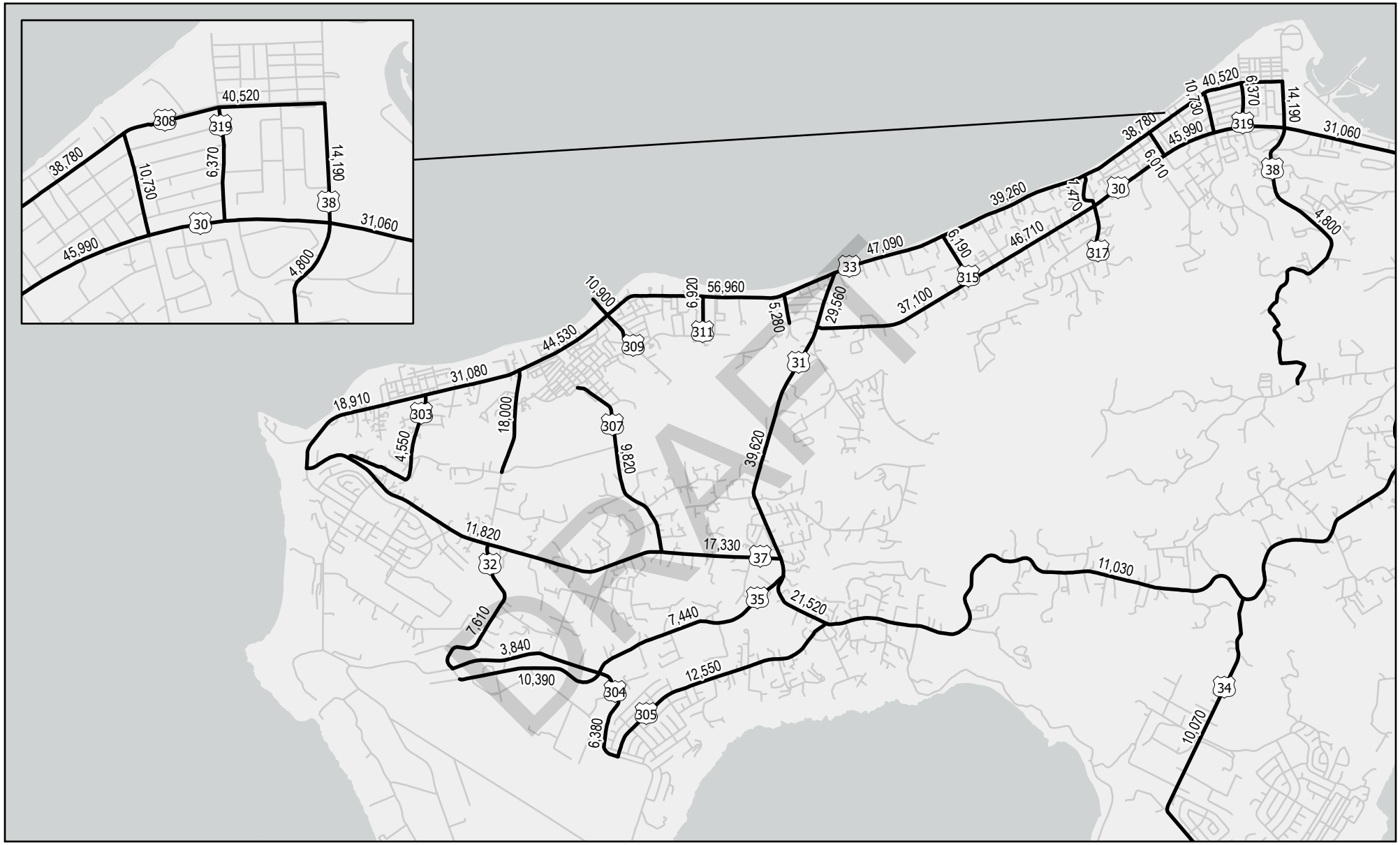
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ID	Route Name	Road Name	Location	Roadway Classification	PM Peak Volume	PM Peak LOS
S-40	Rte 309	Chalan Hagoi	east of Route 33 (Beach Road)	2-Lane Major Collector	1,120	B or better
S-41	Rte 34	Kagman Road		2-Lane Major Collector	1,040	B or better
R-1	Rte 10	Airport Road	north of Esong (Pinatang Park)	2-Lane Minor Arterial	250	C or better
R-2	Rte 10	Airport Road	south of Rte 101	2-Lane Minor Arterial	250	C or better
R-3	Rte 100	Talakhaya Road	east of Sonsong Village and west of Pona Point	2-Lane Major Collector	150	C or better
R-4	Rte 100	Eastern Loop Road	south of Sinapalu	2-Lane Major Collector	150	C or better
R-5	Rte 11	Coral Road	south of Sinapalu	2-Lane Major Collector	160	C or better
R-6		San Jose Street	south of Rte 10	2-Lane Local	60	C or better
R-7		San Francisco De Borja St	south of Rte 10	2-Lane Minor Arterial	110	C or better
R-8		Santa Ana Street	San Jose St to Rte 100	2-Lane Local	60	C or better
R-9		San Ignacio Street	north of Santa Ana Street	2-Lane Local	320	C or better
R-10		San Ignacio Street	south of Santa Ana Street	2-Lane Local	210	C or better
T-1		Riverside Drive	east of 8th Street	2-Lane Minor Collector	20	C or better
T-2		Riverside Drive	west of 8th Street	2-Lane Minor Collector	20	C or better
T-4		8th Street	north of 86th Street	2-Lane Minor Arterial	20	C or better
T-5		8th Street	south of 86th Street	2-Lane Minor Arterial	20	C or better
T-6		86th Ave	8th Street to Broadway	2-Lane Minor Collector	20	C or better
T-7	Rte 21	Broadway	north of 86th Street	2-Lane Minor Arterial	40	C or better
T-8	Rte 21	Broadway	north of 42nd Street	2-Lane Minor Arterial	100	C or better
T-9	Rte 21	Broadway	42nd Street to Rte 201	2-Lane Minor Arterial	370	C or better
T-10		42nd Street	west of Broadway	2-Lane Major Collector	40	C or better
T-11		8th Street	north of 42nd Street to Riverside Dr	2-Lane Minor Arterial	40	C or better
T-12		No Name (School Road)	Rte 202 to 8th Street	2-Lane Local	80	C or better
T-13		8th Street	north of Canal Street	2-Lane Minor Arterial	80	C or better
T-14	Rte 202	Canal Street	west of Broadway	2-Lane Major Collector	410	C or better
T-15	Rte 201	Grand Street	west of Broadway	2-Lane Major Collector	530	C or better
T-16	Rte 21	Broadway	south end / north of Wall Street	2-Lane Minor Arterial	80	C or better
T-17	Rte 21	No name	at Bus Stop / south of Kammer Beach	2-Lane Local	270	C or better
T-18		No Name	road north of Breakwater Park	2-Lane Major Collector	80	C or better

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Legend

Roadway Study Segments

XX,XXX 2040 Forecasted Daily Volumes

Paper Size ANSI A

0 2,250 4,500

US Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

Commonwealth of the Northern Mariana Islands
20 - Year Highway Master Plan

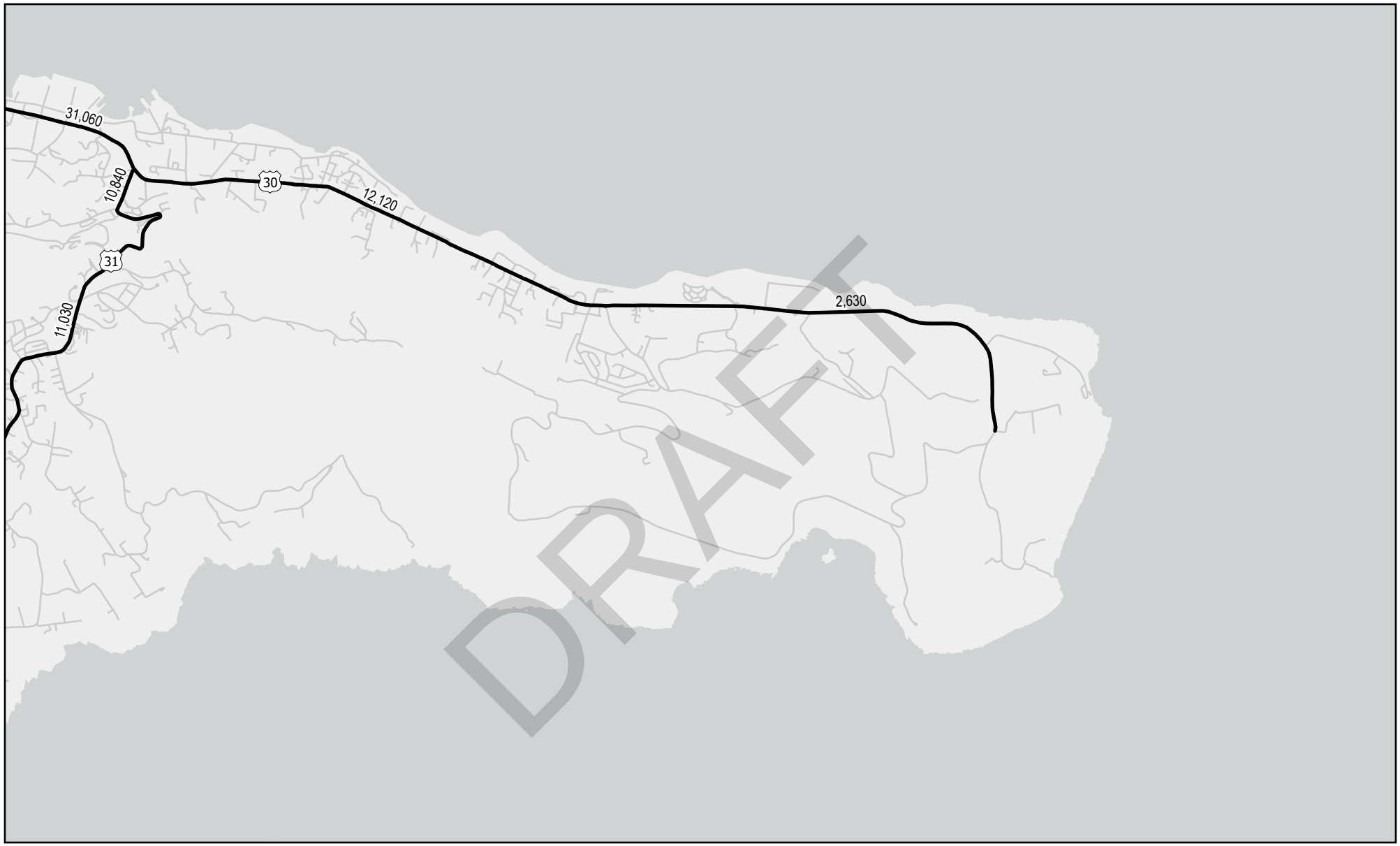
LONG-TERM (2040) DAILY TRAFFIC VOLUMES - SAIPAN

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

FIGURE 5-3

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Print date: 27 Jul 2022 - 13:22

Data source: Light Gray Base: BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, METI/NASA, USGS; 2021 Existing Counts: CNMI, 2021; 2021 Count Estimates: GHD, 2021. Created by: pthornton



Legend

Roadway Study Segments

XX,XXX 2040 Forecasted Daily Volumes

Paper Size ANSI A

0 2,250 4,500

Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

Commonwealth of the Northern Mariana Islands
20 - Year Highway Master Plan

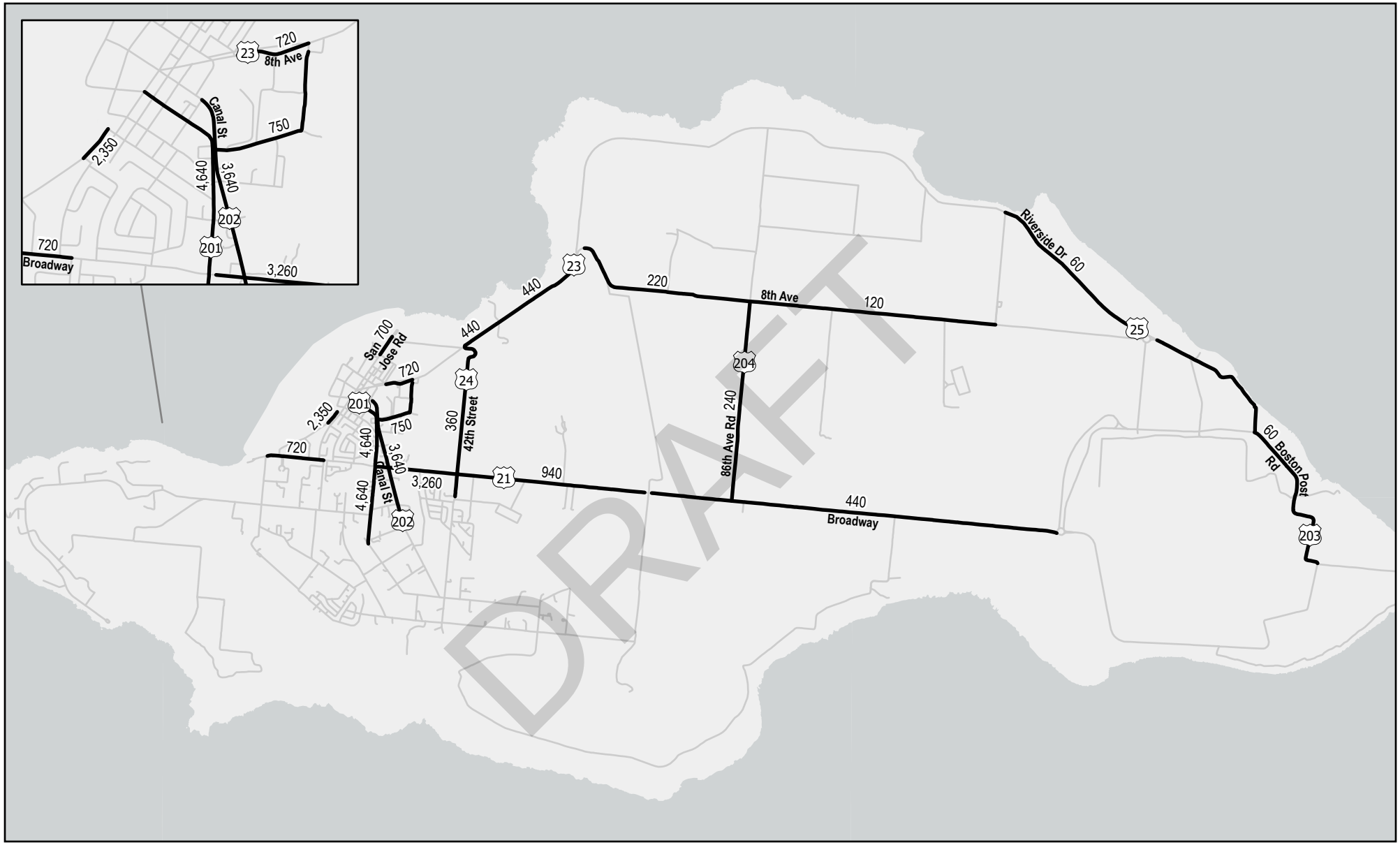
LONG-TERM (2040) DAILY TRAFFIC VOLUMES - SAIPAN (NORTH)

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

FIGURE 5-4

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Print date: 27 Jul 2022 - 13:23

Data source: Light Gray Base: BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, METI/NASA, USGS
World_Light_Gray_Base: Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community; 2021
Existing Counts: CNMI, 2021; 2021 Count Estimates: GHD, 2021. Created by: pthornton



Legend

- Roadway Study Segments
- XX,XXX 2040 Forecasted Daily Volumes

Paper Size ANSI A

0 1,500 3,000 4,500 6,000

US Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

N

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Commonwealth of the Northern Mariana Islands
20 - Year Highway Master Plan

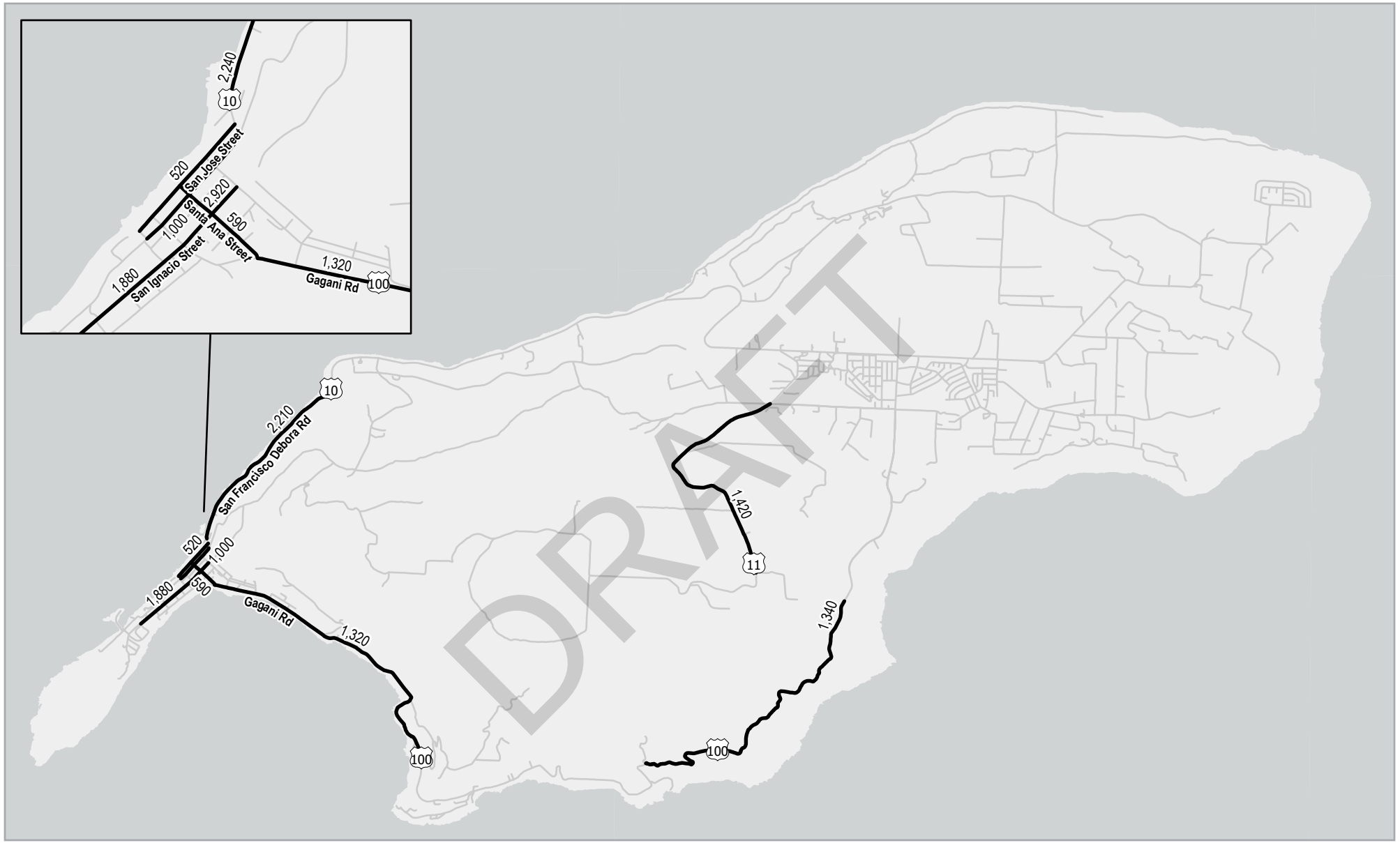
LONG-TERM (2040) DAILY TRAFFIC VOLUMES - TINIAN

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

FIGURE 5-5

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_FIG 505_Long-Term (2040) Daily Traffic Volumes_Tinian
Print date: 27 Jul 2022 - 13:24

Data source: Light Gray Base: Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, METI/NASA, USGS; 2021 Existing Counts: CNMI, 2021; 2021 Count Estimates: GHD, 2021. Created by: pthornton



Legend

Roadway Study Segments

XX,XXX 2040 Forecasted Daily Volumes

Paper Size ANSI A

0 1,500 3,000 4,500 6,000

US Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

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Commonwealth of the Northern Mariana Islands
20 - Year Highway Master Plan

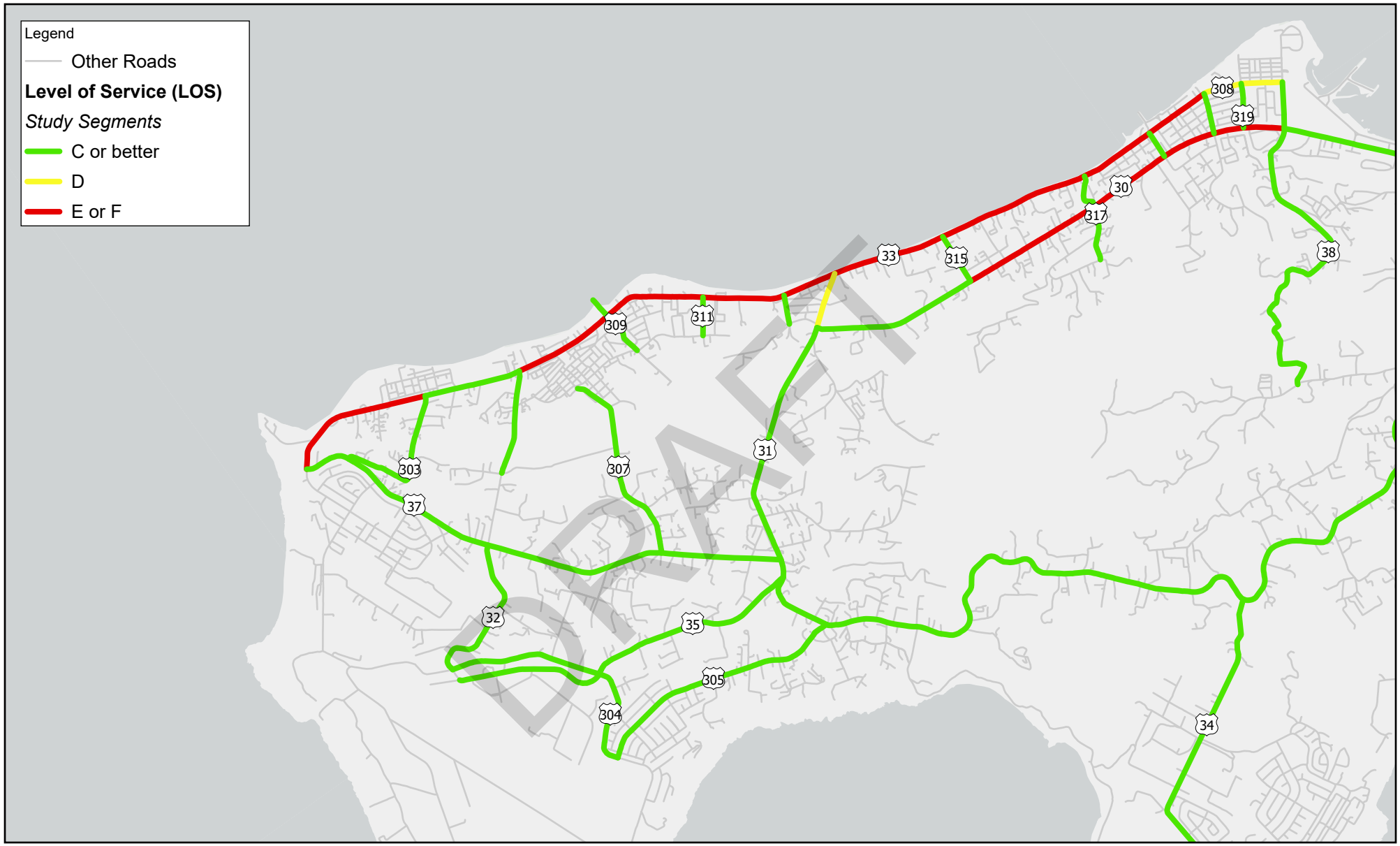
LONG-TERM (2040) DAILY TRAFFIC VOLUMES - ROTA

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

FIGURE 5-6

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_FIG 506_Long-Term (2040) Daily Traffic Volumes_Rota
Print date: 27 Jul 2022 - 13:25

Data source: Light Gray Base: Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, SafeGraph, METI/NASA, USGS; 2021 Existing Counts: CNMI, 2021; 2021 Count Estimates: GHD, 2021. Created by: pthornton



Paper Size ANSI A

0 2,250 4,500

US Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

Commonwealth of the Northern Mariana Islands
20 - Year Highway Master Plan

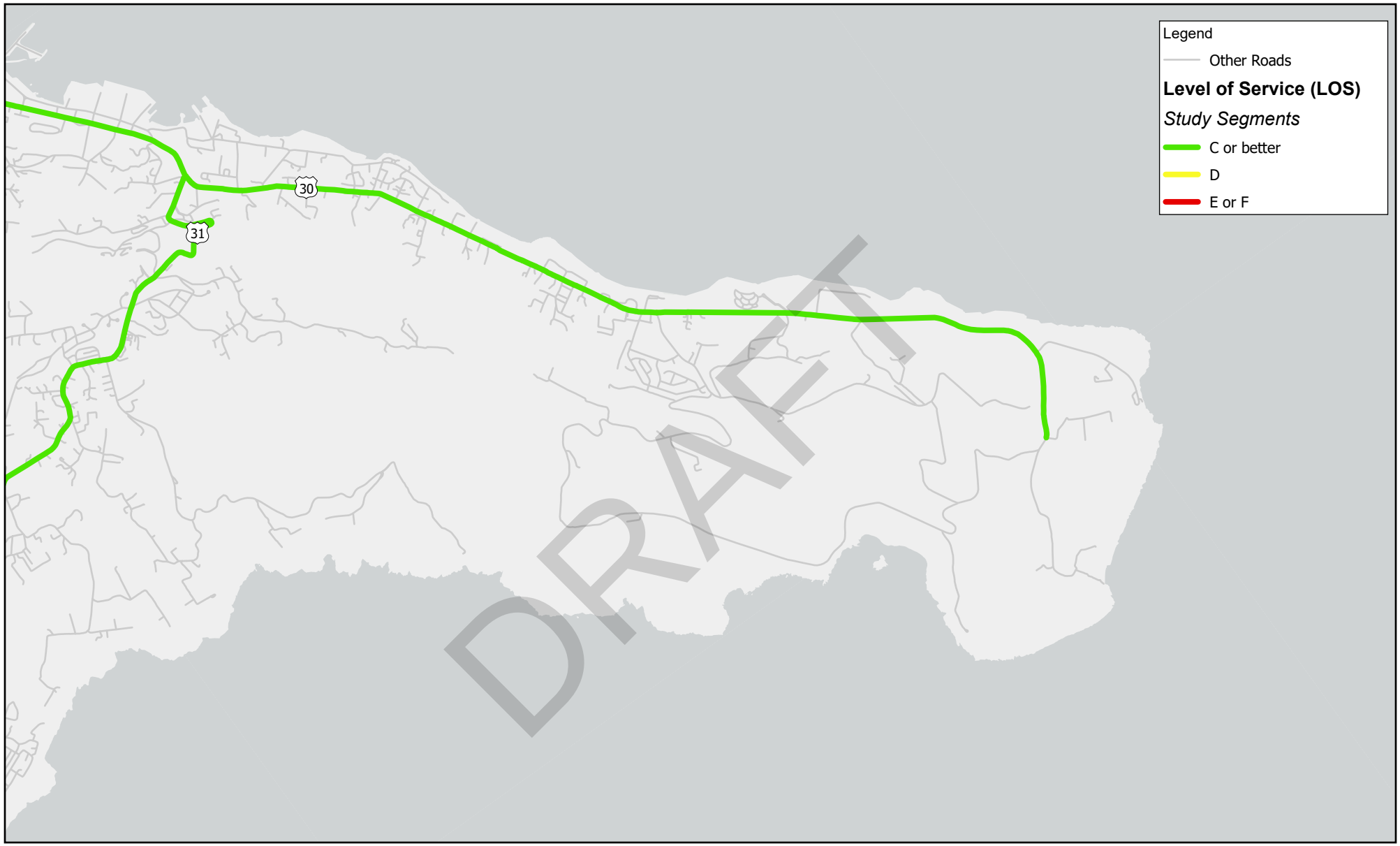
LONG-TERM (2040)
LOS - SAIPAN

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

FIGURE 5-7

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_FIG 507_Long-Term (2040) LOS_Saipan1
Print date: 27 Jul 2022 - 13:27

Data source: Light Gray Base: BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, METI/NASA, USGS; 2021 Existing Counts: CNMI, 2021; 2021 Count Estimates: GHD, 2021. Created by: pthornton



Paper Size ANSI A

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Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

Commonwealth of the Northern Mariana Islands
20 - Year Highway Master Plan

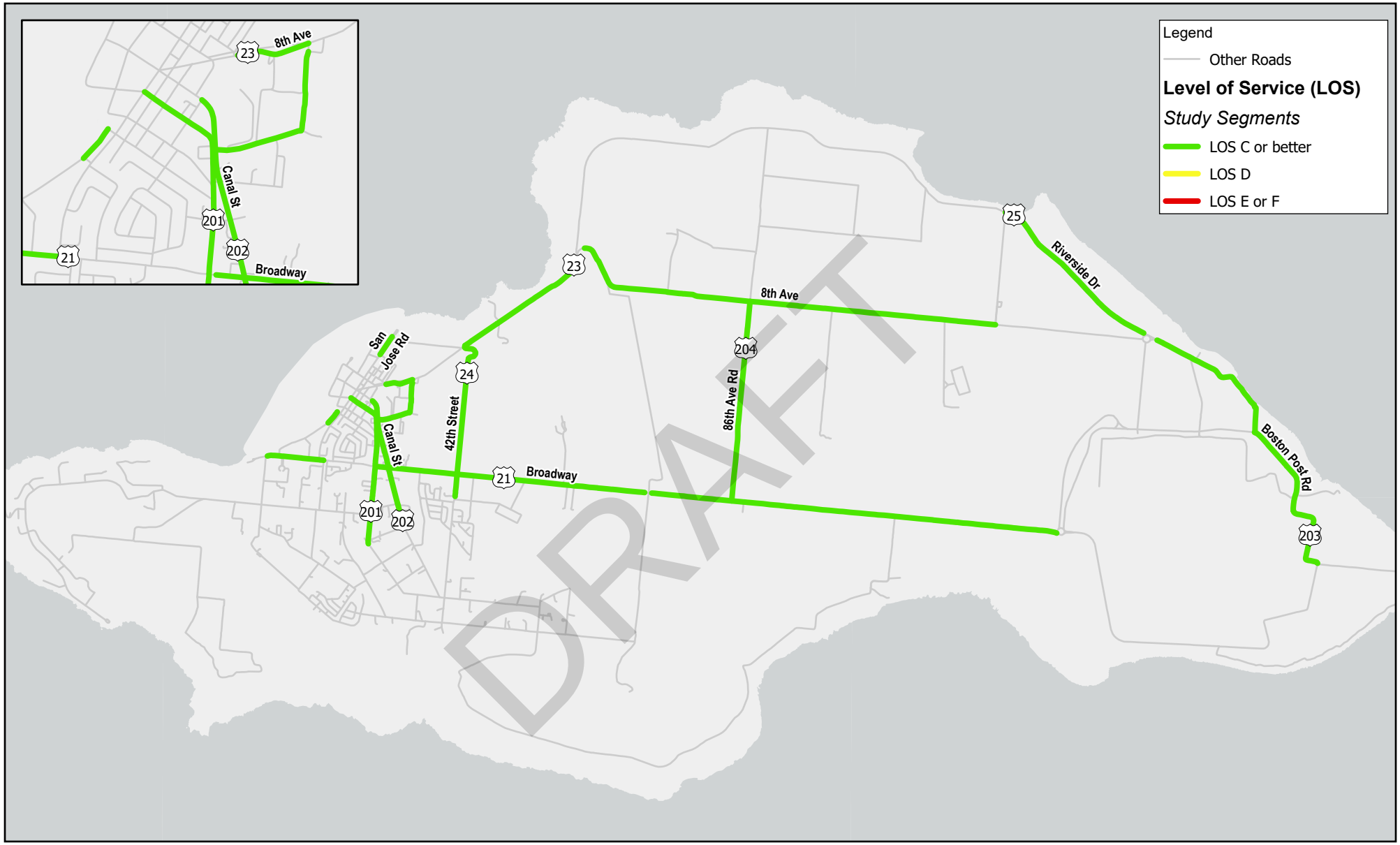
LONG-TERM (2040)
LOS - SAIPAN

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

FIGURE 5-8

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_FIG 508_Long-Term (2040) LOS_Saipan2_North
Print date: 27 Jul 2022 - 13:28

Data source: Light Gray Base: BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, METI/NASA, USGS. Created by: pthornton



Paper Size ANSI A

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US Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

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20 - Year Highway Master Plan

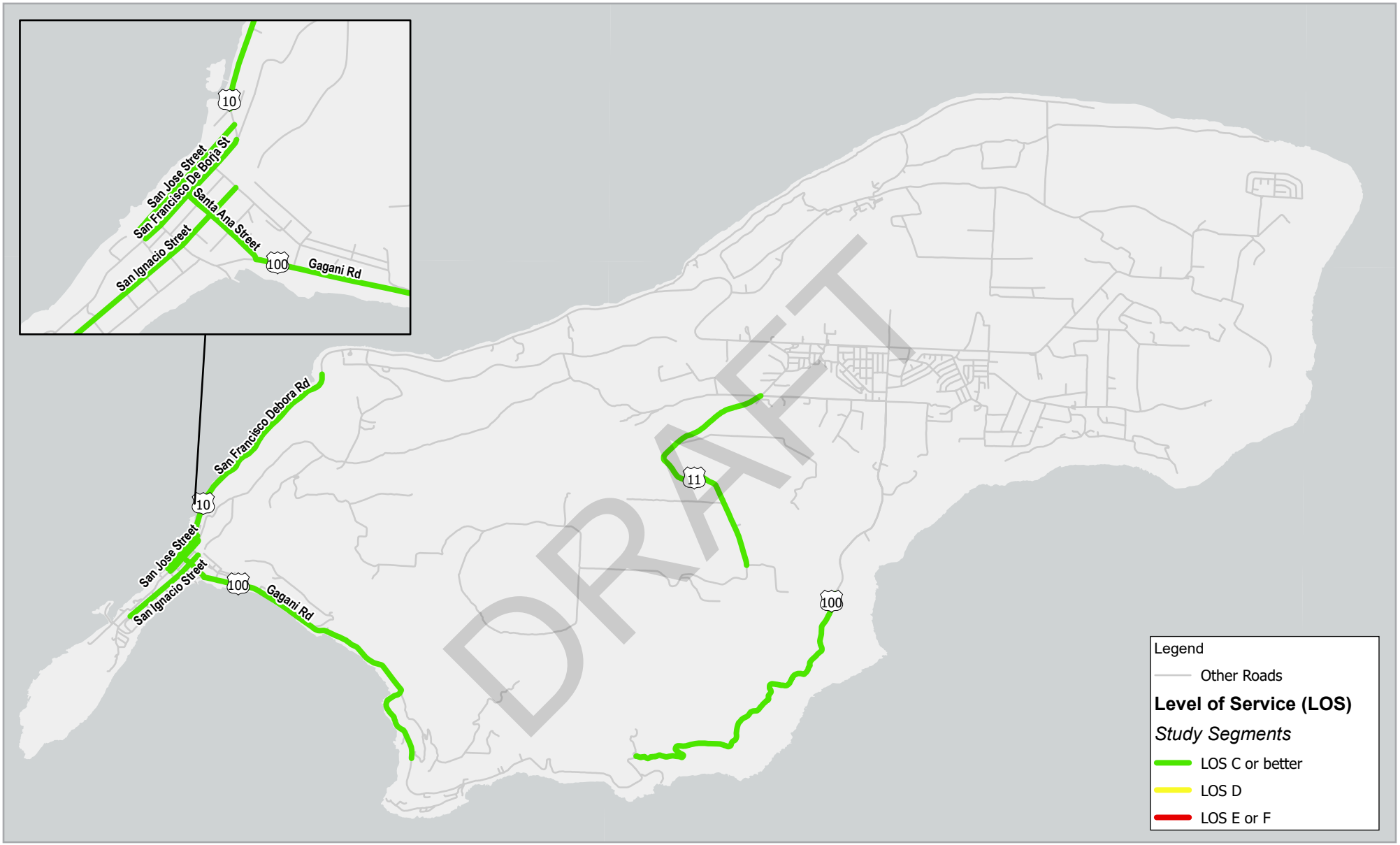
LONG-TERM (2040)
LOS - TINIAN

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

FIGURE 5-9

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_FIG 509_Long-Term (2040) LOS_Tinian
Print date: 27 Jul 2022 - 13:29

Data source: Light Gray Base: Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, METI/NASA, USGS.
Created by: pthornton



Paper Size ANSI A

0 1,500 3,000 4,500 6,000

US Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

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Commonwealth of the Northern Mariana Islands
20 - Year Highway Master Plan

LONG-TERM (2040)
LOS - ROTA

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

FIGURE 5-10

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_FIG 510_Long-Term (2040) LOS_Rota
Print date: 27 Jul 2022 - 13:31

Data source: Light Gray Base: Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, SafeGraph, METI/NASA, USGS. Created by: pthornton

5.3 Long-Term (2040) Intersection Operations

The Synchro 10 (Trafficware) software program was used to implement the HCM 6 analysis methodologies for signalized and stop-controlled intersections. Intersection Level of Service (LOS) was calculated for all control types using the methods documented in HCM 6. For signalized or all-way stop-controlled (AWSC) intersections, an LOS determination is based on the calculated averaged delay for all approaches and movements. For two-way or side-street stop controlled (TWSC) intersections, an LOS determination is based upon the calculated average delay for all movements of the worst performing approach.

Figure 5-11 presents the Long-Term (2040) Conditions peak hour turning movement volume estimates that were utilized for the intersection LOS analysis. Table 5.4 and Figure 5-12 present the PM peak hour intersection operations at study intersections under Long-Term (2040) Conditions, with deficient intersections highlighted. Near-Term Recovery Conditions results are provided for comparison, where two intersections degrade to LOS F with under future conditions.

Table 5.4 Long-Term (2040) Intersection Operations – PM Peak Hour

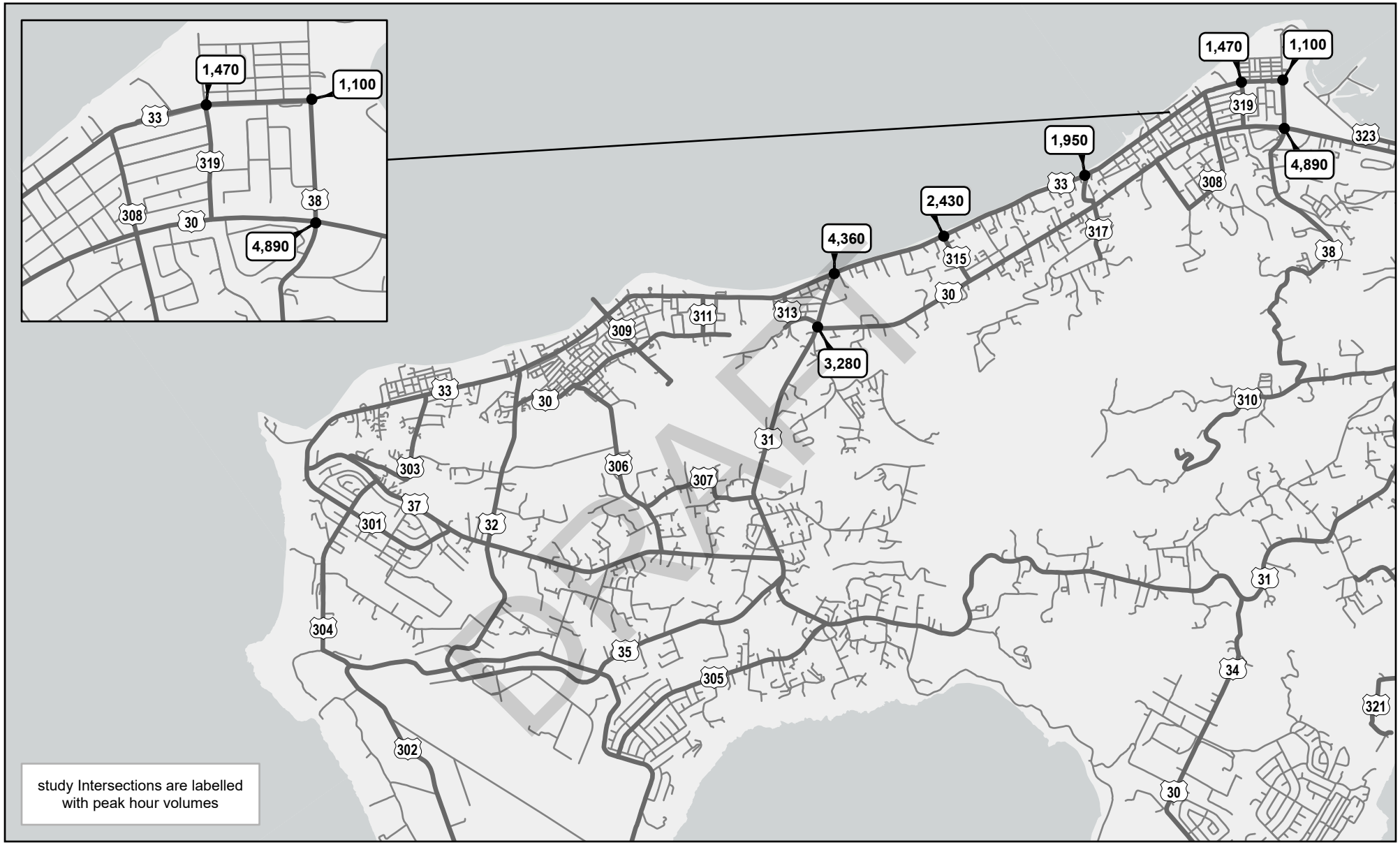
#	Intersection	Control Type[1,2]	Target LOS	Near-Term Recovery Conditions		Long-Term (2040) Conditions	
				Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
1	Route 33 (Beach Road) & Route 38 (Micro Beach Road)	AWSC	D	12.1	B	14.9	B
2	**Route 30 (Middle Road/Chalan Pale Arnold) & Route 38 (Micro Beach Road)**	**Signal**	**E**	**OVR**	**F**	**OVR**	**F**
3	**Route 33 (Beach Road) & Route 319 (CPL Derence Jack Road)**	**TWSC**	**E**	**93.5**	**F**	**OVR**	**F**
4	**Route 33 (Beach Road) & Route 317 (Gualo Rai Road)**	**TWSC**	**E**	48.8	E	**190.3**	**F**
5	**Route 33 (Beach Road) & Route 315 (Quartermaster Road)**	**TWSC**	**E**	**OVR**	**F**	**OVR**	**F**
6	**Route 33 (Beach Road) & Route 31 (Chalan Monsignor Guerrero)**	**Signal**	**D**	50.1	D	**83.9**	**F**
7	Route 30 (Middle Road/Chalan Pale Arnold) & Route 31 (Chalan Monsignor Guerrero)	Signal	D	29.5	C	50.4	D

Notes:

1. *AWSC = All Way Stop Control; TWSC = Two Way Stop Control*
2. *LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC, Signal*
3. ***Bold** = Unacceptable Conditions*
4. *OVR = Delay over 300 seconds*

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Legend

- Study Intersections Locations
- Highways
- Other Roads

Paper Size ANSI A

0 2,250 4,500

US Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

Commonwealth of the Northern Mariana Islands
20 - Year Highway Master Plan

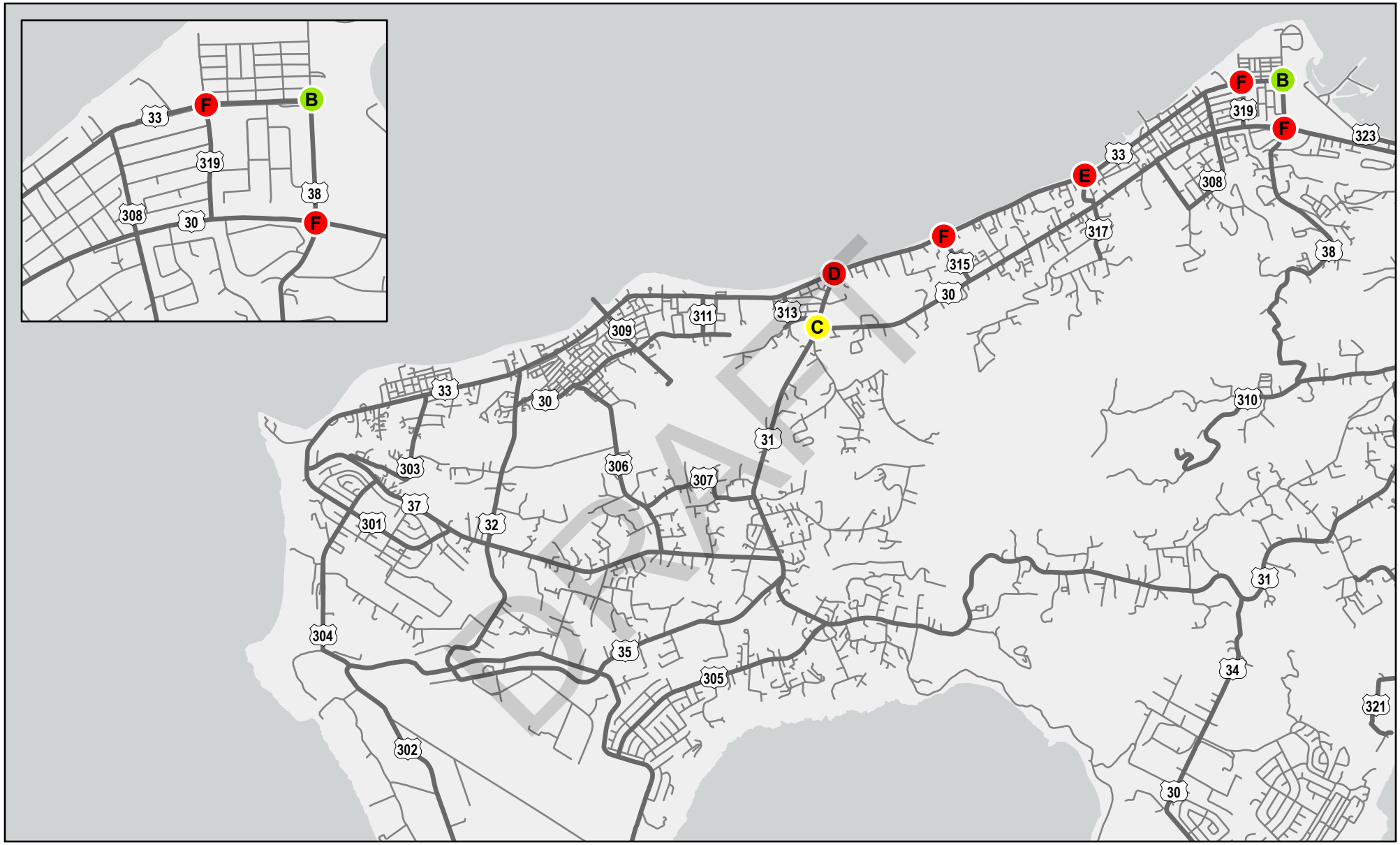
LONG-TERM (2040) STUDY INTERSECTION PEAK HOUR VOLUMES

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

FIGURE 5-11

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_FIG 511_Long-Term (2040) Study Intersection_Peak Hr Vol_Saipan
Print date: 27 Jul 2022 - 13:33

Data source: Light Gray Base: BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, METI/NASA, USGS. Created by: pthornton



Legend

Level of Service (LOS)

- LOS C or better
- D
- LOS E or F

Highways

Other Roads

Paper Size ANSI A

0 2,250 4,500

Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

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Commonwealth of the Northern Mariana Islands
20 - Year Highway Master Plan

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

LONG-TERM (2040) STUDY INTERSECTION LOS

FIGURE 5-12

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_FIG 512_Long-Term (2040)_Study Intersection LOS_Saipan
Print date: 27 Jul 2022 - 13:35

Data source: Light Gray Base: BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, METI/NASA, USGS. Created by: pthornton

6 Roadway Improvement Plans

6.1 Goals and Objectives

The circulation and mobility on the three islands of CNMI is constrained and impacted by various issues and facilities. Information was gathered which included discussions with Department of Public Works staff on congested areas, safety issues and operations, constraints to circulation, and potential impacts to the mobility of the island. The recommendations presented in this report are intended to improve circulation, increase safety for pedestrians, bicyclists and motorists, reduce congestion resulting in less resource consumption and pollution, maintain the local natural environment, and accommodate the increased traffic demand for future conditions.

To maintain the mobility on the islands, the identified improvements are divided into long-term and near-term recommendations. The designated timeframe for long-term improvements would be from 5 to 10 years whereas the designated timeframe for near-term recommendations would be from 1 to 4 years. Long-term recommendations are improvements or upgrades that may be on a larger scale and take a longer time period to implement or modifications that are not immediately necessary but should be implemented to maintain the mobility on the islands. Near-term improvements, modifications and upgrades that should be implemented due to their critical nature or are on a smaller scale and could be implemented in a shorter timeframe.

Recommended improvements are provided both on a project-wide basis for all three CNMI islands and specific roadway improvement projects for each of the three islands. Improvements were sourced from the 2008 Highway Master Plan, public input during the outreach effort, and recommendations from members of CNMI Department of Public Works (DPW) staff. In addition, existing conditions inventory data was supplemented with a field visit by the project team, during which the photos on the following pages were taken.

Proposed near-term and long-term improvements and detailed discussions of each near-term and long-term recommendation are presented in this section. In addition, general improvements which apply to general locations on all three islands are described below.

6.2 General Improvements

General improvements include those that apply aim to address broad challenges facing mobility and safety and they are applicable to general locations on all Saipan, Tinian, and Rota. These general improvement types should be considered for implementation in addition to the Near and Long-term improvements identified in preceding sections. Details descriptions of the improvements follow. The general improvement types are listed below:

1. Implement a Roadway Pavement and Delineation Maintenance
2. Improve Multimodal Infrastructure & Lighting in Populated Areas/Villages and Near Schools
3. Increase Signage
4. Improve/Upgrade Traffic Signals
5. Evaluate Roundabouts
6. Improve Culverts
7. Data Collection
8. Improve Safety on Priority Roadways

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PS-1 Roadway Pavement and Delineation Maintenance and Improvement Program PS-2

A significant amount of roadway pavement and markings on the CNMI islands are identified to be in average to poor conditions. As mentioned in the existing condition section, roadways with pot holes, cracks, unpaved shoulders and abrupt edges, are not uncommon on the islands. Some of the roadways located in rural areas are even unpaved gravel or dirt roads. For the roadway striping, except those roadways and intersections that have been recently modified, the striping on the road is mostly faded or hardly visible due to the lack of contrast between the pavement and the painted strips. The following images show examples of locations where pavement is in poor condition, is entirely unpaved, or where striping is faded or hardly visible to drivers.

Photo 6-1 Example of Existing Unpaved Roadway (Route 232) (Saipan)



Having a smoother roadway surface and clear roadway markings, not only could the riding quality be greatly enhanced, but roadway safety and traffic flow could also be improved. This study, therefore, recommends the implementation of a roadway pavement and delineation maintenance and improvement program for the three CNMI islands to inspect, install, maintain, and repair roadway pavement and pavement markings in a programmatic basis. The goal of this program is to enhance the physical roadway environment and provide a safe and secure pavement system for motorists and tourists on the CNMI islands.

The improvement program would require regular inspection and inventory of roadway pavement and markings conditions on the islands. This could be done by performing regular drive through and visual inspection on the roadways. Information collected on pavement conditions of the roadways could then be used to prioritize the needs for repaving, rehabilitation, reconstruction, and installation of roadway surface and restriping faded pavement markings.

To increase the visibility of the pavement markings, it is also recommended to overlay the roadway surface with a layer of slurry seal before laying on the roadway pavement markings or delineators. The black slurry seal would provide a better contrast with the white or yellow pavement delineation devices.

Photo 6-2 Example of Poor Pavement & Striping Conditions at the Intersection of Route 38 & Route 30 (Saipan)



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Photo 6-3 Existing Condition: Route 203 (Tinian)



PS-2 Improve Multimodal Infrastructure & Lighting in Populated Areas/Villages and near Schools

Roadways in populated areas/villages and near schools should include multimodal infrastructure including pedestrian paths or sidewalks, and bicycle lanes. At a minimum, side paths should be provided adjacent to roadways where pedestrian activity is anticipated to occur between residential and commercial land uses. The example below shows an official pedestrian dirty path that could be improve into a formal walking area (paved or unpaved) to designate safe areas for pedestrians walking on Micro Beach Road.

According to the public outreach effort for this plan, residents of CNMI have expressed a need for improved pedestrian infrastructure, including sidewalk, crosswalks, and lighting, and improved bicycle infrastructure, including bike lanes, or widened shoulders. This input is documented in Chapter 4 of this plan.

Photo 6-4 Lack of Pedestrian Facilities on Route 38 (Saipan)



Street and pedestrian-level lighting are also recommended along roadways in populated areas/villages and near schools. Providing lighting on a roadway at night improves the visibility of the roadway and its immediate environment. Pedestrian lighting specifically shines light on the sidewalk and is important to include in street design along with roadway lighting.

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Photo 6-5 Lack of Pedestrian Facilities on Route 21 (Broadway) (Tinian)



Photo 6-6 Lack of Pedestrian Facilities on Route 10 near Guata Beach Park (Rota)



PS-3 Increase Signage

Specifically on highways, signage is critical to orient drivers especially if the surrounding environment is not familiar to. This is especially helpful for tourists who may have rented a vehicle but are otherwise unfamiliar with the roadway network. Directional and guide signs would enhance the driver experience and eliminate confusion especially for visitors and unfamiliar motorists. Route signage on highways, as shown in the example below, direct drivers to connecting routes with directional arrows and route numbers.

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Photo 6-7 Example of Existing Route Signage on Route 30 (Saipan)



Wayfinding is also a navigation tool and is recommended on the islands, especially in areas with increased commercial activity. Wayfinding includes guide signs that direct road users to destinations accessible via the roadway and multimodal network and is helpful to both motorist and non-motorists. Popular attractions, such as the resorts, beaches, harbor, island areas, and airport should be signed better.

Signage can also play a role in improving safety on the island roadways by eliminating potential confusion for motorists. In addition, advance warning signs such as notification of blind curves are useful to informing motorists of potentially hazardous roadway conditions. The photos below show examples of blind curves on Saipan highways.

Photo 6-8 Existing Condition: Blind Curve on Route 303 approaching Route 37 (Saipan)



Photo 6-9 Existing Condition: Blind Curve on Route 318 (Saipan)



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Photo 6-10 Existing Condition: No Signage at Route 23 & Route 202 & Route 26 (Tinian)



PS-4 Improve/Upgrade Traffic Signals

Traffic signals should be upgraded with video detection via cameras to allow actuated signal timing. Due to the humidity of the climate on the island, signal hardware often becomes damaged which results in using default pretimed signal phases. Actuated signal timing improves the operational efficiency of the intersection.

Photo 6-11 Example of an Existing Traffic Signal: Route 30 & Route 38 (Saipan)

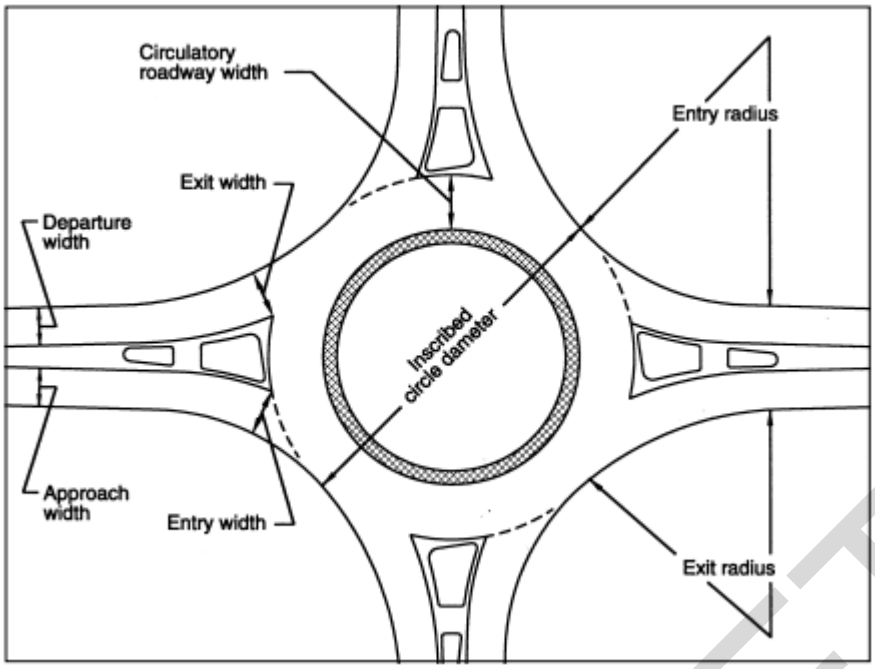


PS-5 Evaluate Roundabouts

Roundabouts are a type of circular intersection configuration that safely and efficiently moves traffic through an intersection. They have considerable benefits for intersection control, including collision reduction potential, lower vehicle speeds, and improved operational performance. They also could eliminate the need to widen the roadways to address congestion by improving operations at the intersection. The following illustration provides key roundabout dimensions.

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Illustration 6-1 Key Roundabout Dimensions (US Department of Transportation)

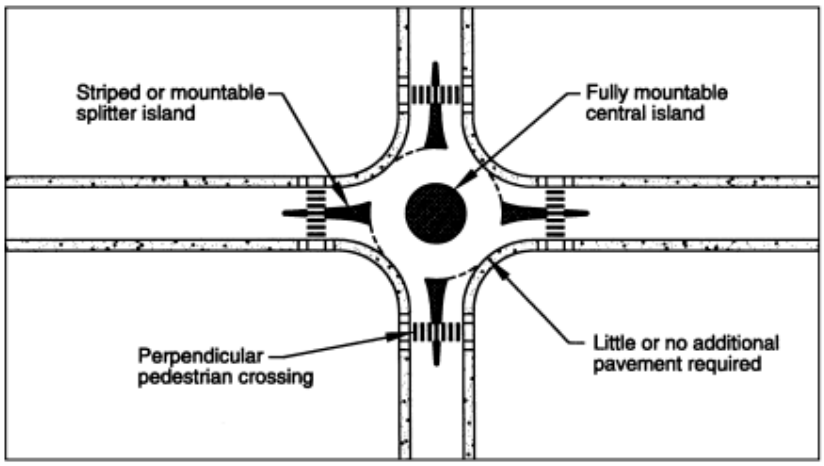


In addition, since roundabouts do not require electricity for essential function and provide traffic control through their physical design, this plan recommends that all intersections requiring modifications or upgrades be evaluated for roundabout control. Loss of power is a common occurrence on the islands and results in shutting down of traffic signals, and consequently the loss of their effective traffic control. This occurrence is dangerous not only for the increased potential of traffic accidents, but also for the reduced efficiency of travel during evacuation events.

Roundabouts are recommended at several locations on Saipan; however, this plan recommends a comprehensive evaluation of roundabout potential for all future intersection modifications to determine if roundabout, signalize, or stop-control is most appropriate for specific locations. There is currently one roundabout at the intersection of Route 21 (Broadway) and Canal on the island of Tinian. This plan recommends modifying this roundabout to address existing operational and safety challenges due to its original design.

The following are examples of different roundabout types that could be implemented on the islands. These illustrations are sources from the US Department of Transportation Federal Highway Administration (FHWA).

Illustration 6-2 Typical Mini-Roundabout: 45 to 80-feet Inscribed Circle Diameter



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Illustration 6-3 Typical Urban Compact Roundabout: 80 to 100-feet Inscribed Circle Diameter

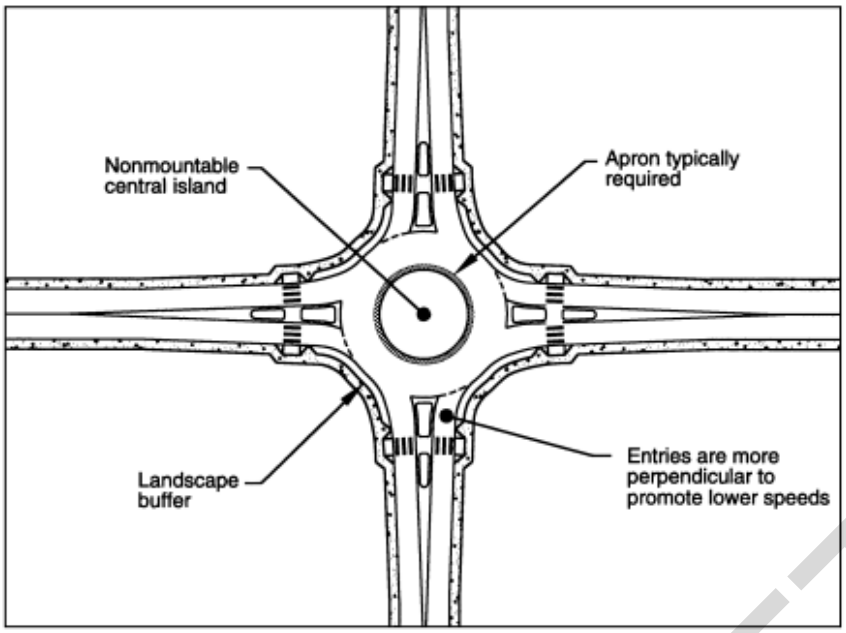
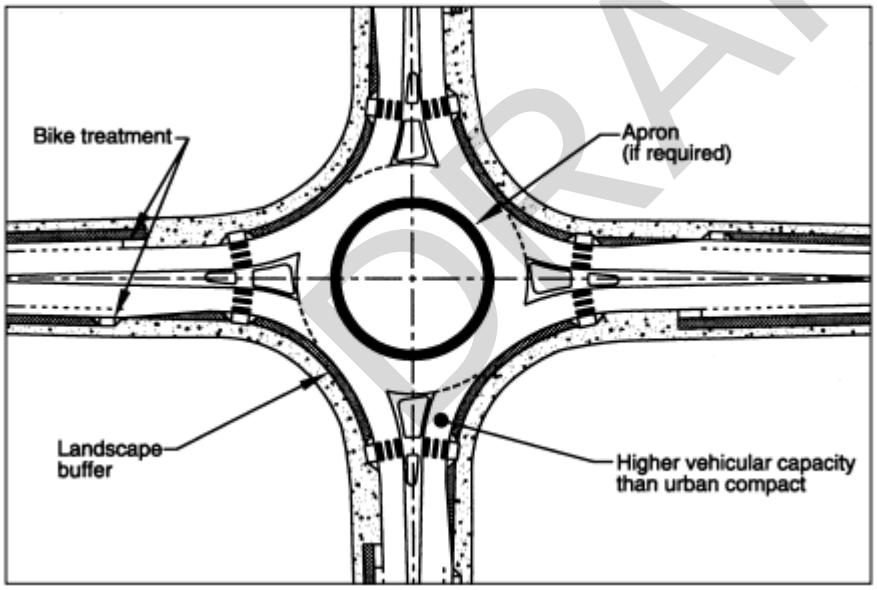


Illustration 6-4 Typical Single Lane Roundabout: 100 to 130-feet Inscribed Circle Diameter



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PS-6 Improve Culverts

Culverts on the islands channel water under roadways. Some existing culverts are deteriorating or failing and affecting the drainage systems on the islands. This can lead to erosion and potential roadway embankment failure. Other culverts are narrow and constrain the movement of traffic. Some culverts, particularly on Rota, are located under unpaved highways and lack safety rails or advisory signs to signal caution to approaching motorists. Temporary measures installed by DPW should be replaced by physical barriers. This plan recommends rehabilitating existing culverts.

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Photo 6-12 Existing Condition: Narrow Culvert on Route 314, West of Route 30 (Saipan)



Photo 6-13 Existing Condition: Narrow Culvert on Route 100 (Rota)



PS-7 Data Collection

This plan recommends that CNMI create and continually update relevant transportation and safety data to assist in planning efforts and decision-making processes. The following data sources, among others, are recommended:

– Traffic Data:
  - Average daily traffic (ADT) roadway counts
  - Peak hour intersection traffic counts
– Geographic Information System (GIS) Data:
  - Roadway infrastructure
  - Intersection location & control type
  - Multimodal infrastructure (pedestrian paths, sidewalks, bicycle lanes, transit stops/routes)
  - Pavement condition (Pavement condition index (PCI) should be established consistent with project PS-1)
– Safety Data:
  - Collision location, type, & severity on roadways and at intersections

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PS-8 Improve Safety on Priority Roadways

This improvement recommendation aims to determine priority segments along study roadways for safety improvements based on the following data.

Crash Rates

As presented in Chapter 3 of this plan, collisions on study roadways were evaluated in terms of collision rate for total or fatal + injury collisions. Collision rates are helpful in comparing study segments to each other, as the rates take into account both segment length and daily volume to account for variations in study segments. The study segments with the highest rate (top 10) for either total or fatal + injury collisions are shown in Table 6.1. Garapan Street has the highest total collision rate and fatal + injury collision rates with a length of 1,370-feet (1/4-mile) with 19 total and 3 injury collisions. The top five (5) segments with the highest crash rates for either total or fatal + injury collisions are highlighted in blue below.

Table 6.1 Priority Roadways based on Crash Rates

			2017 Collisions				Total Collisions Rate	Fatal + Injury Collisions Rate
Study Segment	Road Name	Location	Total	Non-Injury	Injury	Fatal	Rank (of all)	Rank (of all)
S-1	Beach Road	Micro Beach to Garapan St.	**87**	84	3	-	3	17
S-2	Beach Road	Garapan St. to Gualo Rai Rd.	**76**	65	11	-	7	6
S-6	Beach Road	Chalan Hagoi to As Perdido Rd.	**59**	54	5	-	10	15
S-12	Middle Road/Chalan Pale Arnold	Micro Beach Road to Gualo Rai Road	**129**	114	15	-	8	8
S-13	Middle Road/Chalan Pale Arnold	Gualo Rai Road to Quartermaster Road	**86**	72	14	-	9	4
S-22	Dan Dan Road	Chalan Monsignor Guerrero to Flame Tree Road	**18**	11	7	-	28	3
S-27	As Perdido Road	Beach Road to Chalan Monsignor Martinez	**26**	23	3	-	6	7
S-29	Gualo Rai Road	east of Beach Road	**4**	4	-	-	2	27
S-33	Garapan Street	east of Beach Road	**19**	16	3	-	1	1
S-35	Micro Beach Road	east of Beach Road	**10**	6	4	-	5	2
S-36	Afetna Road	east of Beach Road	**12**	12	-	-	4	27

Note: Values in columns are shaded according to their respective ranking compared to all study roadway segments, where dark red represents worse conditions.

Collision Severity

The roadway segments with at least one (1) fatal collision and more than five (5) injury collisions are shown Table 6.2. Five (5) fatal collisions occurred in 2017 on three (3) roadway segments of Beach Road, Middle Road/Chalan Pale Arnold, and Chalan Monsignor Guerrero.

Collisions Involving a Pedestrian

There was a total of twelve (12) collisions that involved a pedestrian that occurred on study facilities in 2017. Of those collisions, most resulted in injuries and one (1) resulted in a fatality. Eight (8) collisions with a pedestrian occurred on Middle Road/Chalan Pale Arnold, and three (3) occurred on Chalan Monsignor Guerrero, including one (1) fatality.

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Table 6.2 Priority Roadways based on Severity

Segment	Road Name	Location	Total	Injury	Fatal
S-2	Beach Road	Garapan St. to Gualo Rai Rd.	**76**	11	-
S-5	Beach Road	Chalan Monsignor Guerrero to Chalan Hagoi	**157**	19	1
S-11	Middle Road/Chalan Pale Arnold	Isa Drive to Micro Beach Road	**38**	6	1
S-12	Middle Road/Chalan Pale Arnold	Micro Beach Road to Gualo Rai Road	**129**	15	-
S-13	Middle Road/Chalan Pale Arnold	Gualo Rai Road to Quartermaster Road	**86**	14	-
S-16	Chalan Monsignor Guerrero	Chalan Pale Arnold to Chalan Msgr. Martinez	**75**	9	3
S-21	Isa Drive	Capitol Hill Road to Dan Dan Road	**66**	9	-
S-22	Dan Dan Road	Chalan Monsignor Guerrero to Flame Tree Road	**18**	7	-
S-26	Chalan Monsignor Martinez	Chalan Tun Joaquin Doi to Beach Road	**50**	7	-

Table 6.3 Collisions Involving a Pedestrian

Segment	Injuries	Fatalities
Middle Road/Chalan Pale Arnold, east of Saluda Street	**1**	
Middle Road/Chalan Pale Arnold & Gobietno Drive	**1**	
Middle Road/Chalan Pale Arnold & Cheribiyan Drive	**1**	
Middle Road/Chalan Pale Arnold & Europa Place	**3**	
Middle Road/Chalan Pale Arnold & Micro Beach Road	**2**	
Chalan Monsignor Guerrero & Kannat Tabla Drive		**1**
Chalan Monsignor Guerrero, east of Rasimu Lane		
Chalan Monsignor Guerrero & Tanduki Drive	**1**	
Beach Road & Kadena Di Amor Street	**2**	
Isa Drive & Atkiya Drive		
Beach Road Garapan, south of Pupulu Drive	**1**	
Chalan Antonio Apa & Bobolong Drive	**1**	

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Top 10 Priority Roadways

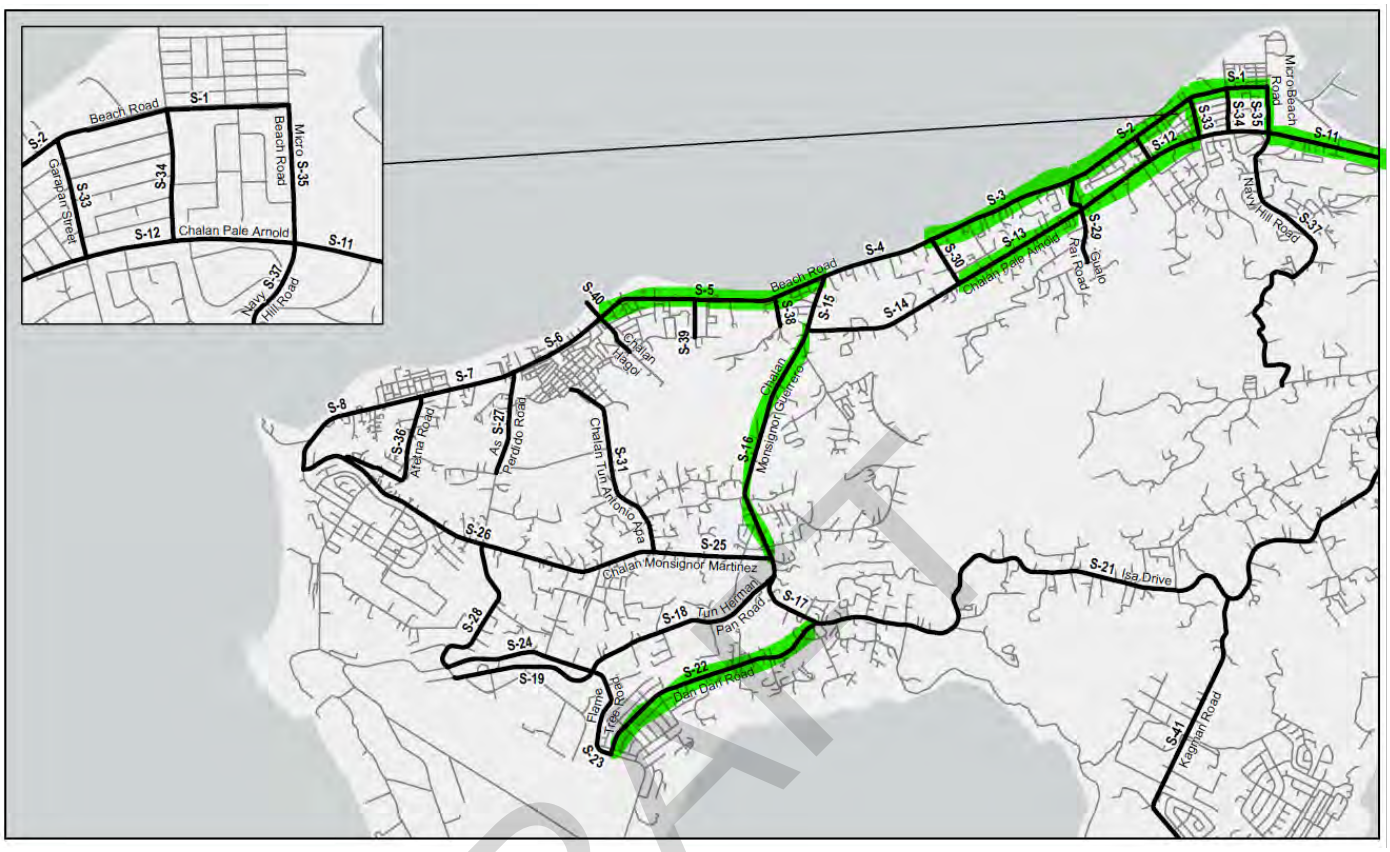
The top ten (10) priority roadways were identified based on crash rates, collision severity, and pedestrian involvement:

1. S-33: Route 308 (Garapan Street), east of Beach Road (based on crash rate)
2. S-35: Route 38 (Micro Beach Road), east of Beach Road (based on crash rate)
3. S-16: Route 30 (Chalan Monsignor Guerrero), between Chalan Pale Arnold and Chalan Monsignor Martinez (based on fatal, injury, and pedestrian collisions)
4. S-1: Route 33 (Beach Road), between Micro Beach and Garapan Street (based on crash rate)
5. S-11: Route 31 (Middle Road/Chalan Pale Arnold), between Isa Drive and Micro Beach Road (based on fatal, injury, and pedestrian collisions)
6. S-22: Route 305 (DanDan Road), between Chalan Monsignor Guerrero to Flame Tree Road (based on crash rate)
7. S-5: Route 33 (Beach Road), from Chalan Monsignor Guerrero to Chalan Hagoi (based on fatal and injury collisions)
8. S-12: Route 31 (Middle Road/Chalan Pale Arnold), between Micro Beach Road to Gualo Rai Road (based on injury collisions)
9. S-13: Route 31 (Middle Road/Chalan Pale Arnold), between Gualo Rai Road to Quartermaster Road (based on injury collisions)
10. S-29: Route 317 (Gualo Rai Road), east of Beach Road (based on crash rate)

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The top ten (10) priority roadways for safety improvements are highlight in the image below.

Photo 6-14 Top 10 Priority Roadways for Safety Improvements



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6.3 Saipan Improvements

6.3.1 Saipan Near-Term Recovery Conditions Improvements

The comprehensive list of near-term improvements for Saipan are listed below and shown in

ID	Location	Improvement	Project Stage
Saipan			
SS-1	Intersection Modification at the following locations:		
SS-1a	*Route 31 (Chalan Monsignor Guerrero) & Route 30 (Middle Road/Chalan Pale Arnold)*	Intersection modification	Planning/Design
SS-1b	*Route 31 (Chalan Monsignor Guerrero) & Route 33 (Beach Road)*	Intersection modification	Planning/Design
SS-1c	*Route 30 (Middle Road/Chalan Pale Arnold) & Navy Hill Road*	Intersection modification	Planning/Design
SS-1d	*Route 33 (Beach Road) & Route 308 (Garapan Street)*	Intersection modification	-
SS-1e	*Route 35 (Tun Herman Pan) & Route 304 (Flame Tree Drive)*	Intersection Modification (AWSC)	-
SS-1f	*Route 33 (Beach Road) & Route 37 (Chalan Monsignor Martinez)*	Intersection Modification (SSSC)	-
SS-1g	*Route 304 (Flame Tree Road) & Route 32 (As Perdido Road)*	Intersection modification (AWSC)	-
SS-1h	*Route 304 (Flame Tree Road) & Route 302 (Naftan Road)*	Intersection modification (SSSC or AWSC)	-
SS-2	New Traffic Signal or Roundabout at the following locations:		
SS-2a	*Route 33 (Beach Road) & Quartermaster Road*	Install new traffic signal or roundabout	Under Construction
SS-2b	*Route 33 (Beach Road) & Route 317 (Gualo Rai Road)*	Install new traffic signal	-
SS-2c	*Route 33 (Beach Road) & CPL Derence Jack Road*	Install new roundabout	Planning/Design
SS-2d	*Route 33 (Beach Road) & Route 38 (Micro Beach Road)*	Install new traffic signal	Planning/Design
SS-2e	*Route 31 (Chalan Monsignor Guerrero) & Route 305 (DanDan Road)*	Install new traffic signal	-
SS-2f	*Route 31 (Chalan Monsignor Guerrero) & Route 37 (Chalan Monsignor Martinez)*	Modify traffic signal or install new roundabout	-
SS-2g	*Route 31 (Chalan Monsignor Guerrero) & Route 35 (Tun Herman Pan Road)*	Install install intersection improvement in coordination with SS-2f	-
SS-2h	*Route 32 (As Perdido Road) & Route 37 (Chalan Monsignor Martinez)*	Install new roundabout	-
SS-3	Route 36	Construct new bridge and connection	Under Construction
SS-4	Route 30 (Middle Road/Chalan Pale Arnold) & Commonwealth	Relocate pedestrian signal	Planning/Design
SS-5	Chalan Tun Joaquin Doi in As Terlaje	Improve signage and relocate driveway	Planning/Design
SS-6	Route 38 (Micro Beach Road), west of Route 30 (Middle Road/Chalan Pale Arnold)	Add pedestrian pathway	-
SS-7	Lau Lau Road to Kagman	Upgrade and pave roadway	Under Construction
SS-8	Garapan (area)	Lighting improvement	-

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ID	Location	Improvement	Project Stage
Saipan			
SS-9	Route 33 (Beach Road)	Add mid-block or signalized crosswalks	-
SS-10a	Route 31 (Chalan Monsignor Guerrero)	Speed enforcement	-
SS-10b	Route 30 (Middle Road/Chalan Pale Arnold)	Speed enforcement	-
SS-11	Garapan	Parking enforcement	Planning/Design
SS-12	Garapan	Improve vehicle circulation	Planning/Design
SS-13	Route 30 (Middle Road/Chalan Pale Arnold)	Hazard elimination	Planning/Design
SS-14	Route 306 (Chalan Tun Joaquin Doi) & Texas Road	Add signage	-
SS-15	Route 38 (Navy Hill Road), near CHCC	Construct pedestrian facilities and bike lanes	-
SS-16	Route 302 (Naftan Road), from Route 304 (Flame Tree Road) to Obyan Route 33 (Beach Road)	Improve roadway	-
SS-17	Route 323 (Industrial Drive), from Smiling Cove Road to Lower Base Drive	Improve roadway	-

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Figure 6-1. Projects previously included in the 2008 Highway Master Plan are designated with their respective project stage (i.e., Planning/Design or Under Construction). Descriptions for each new improvement proposed in this plan are provided on the following pages.

Table 6.4 Saipan Near-Term Recovery Conditions Improvements

ID	Location	Improvement	Project Stage
Saipan			
SS-1	Intersection Modification at the following locations:		
SS-1a	*Route 31 (Chalan Monsignor Guerrero) & Route 30 (Middle Road/Chalan Pale Arnold)*	Intersection modification	Planning/Design
SS-1b	*Route 31 (Chalan Monsignor Guerrero) & Route 33 (Beach Road)*	Intersection modification	Planning/Design
SS-1c	*Route 30 (Middle Road/Chalan Pale Arnold) & Navy Hill Road*	Intersection modification	Planning/Design
SS-1d	*Route 33 (Beach Road) & Route 308 (Garapan Street)*	Intersection modification	-
SS-1e	*Route 35 (Tun Herman Pan) & Route 304 (Flame Tree Drive)*	Intersection Modification (AWSC)	-
SS-1f	*Route 33 (Beach Road) & Route 37 (Chalan Monsignor Martinez)*	Intersection Modification (SSSC)	-
SS-1g	*Route 304 (Flame Tree Road) & Route 32 (As Perdido Road)*	Intersection modification (AWSC)	-
SS-1h	*Route 304 (Flame Tree Road) & Route 302 (Naftan Road)*	Intersection modification (SSSC or AWSC)	-
SS-2	New Traffic Signal or Roundabout at the following locations:		
SS-2a	*Route 33 (Beach Road) & Quartermaster Road*	Install new traffic signal or roundabout	Under Construction
SS-2b	*Route 33 (Beach Road) & Route 317 (Gualo Rai Road)*	Install new traffic signal	-
SS-2c	*Route 33 (Beach Road) & CPL Derence Jack Road*	Install new roundabout	Planning/Design
SS-2d	*Route 33 (Beach Road) & Route 38 (Micro Beach Road)*	Install new traffic signal	Planning/Design
SS-2e	*Route 31 (Chalan Monsignor Guerrero) & Route 305 (DanDan Road)*	Install new traffic signal	-
SS-2f	*Route 31 (Chalan Monsignor Guerrero) & Route 37 (Chalan Monsignor Martinez)*	Modify traffic signal or install new roundabout	-
SS-2g	*Route 31 (Chalan Monsignor Guerrero) & Route 35 (Tun Herman Pan Road)*	Install install intersection improvement in coordination with SS-2f	-
SS-2h	*Route 32 (As Perdido Road) & Route 37 (Chalan Monsignor Martinez)*	Install new roundabout	-
SS-3	Route 36	Construct new bridge and connection	Under Construction
SS-4	Route 30 (Middle Road/Chalan Pale Arnold) & Commonwealth	Relocate pedestrian signal	Planning/Design
SS-5	Chalan Tun Joaquin Doi in As Terlaje	Improve signage and relocate driveway	Planning/Design
SS-6	Route 38 (Micro Beach Road), west of Route 30 (Middle Road/Chalan Pale Arnold)	Add pedestrian pathway	-
SS-7	Lau Lau Road to Kagman	Upgrade and pave roadway	Under Construction
SS-8	Garapan (area)	Lighting improvement	-
SS-9	Route 33 (Beach Road)	Add mid-block or signalized crosswalks	-

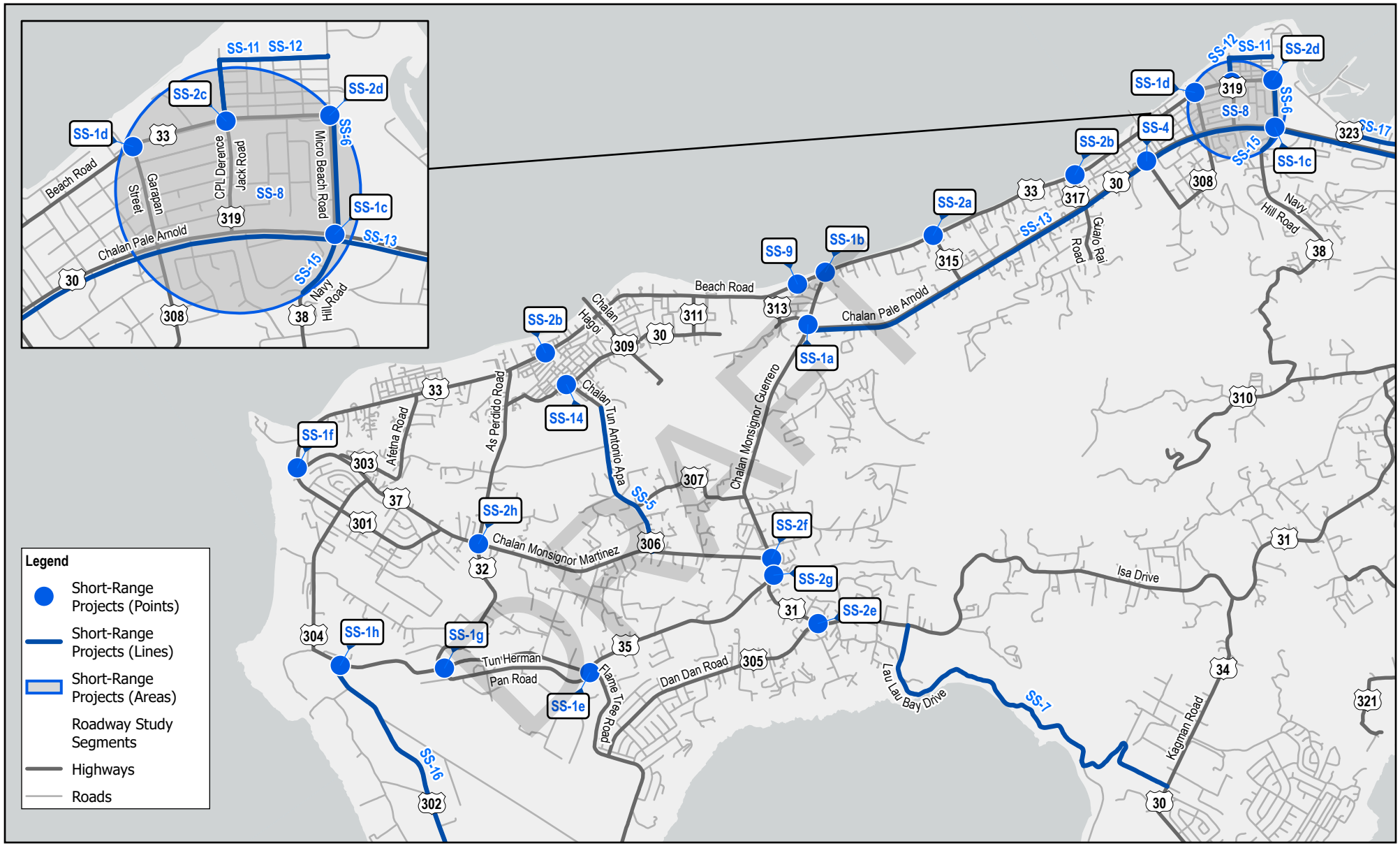
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ID	Location	Improvement	Project Stage
Saipan			
SS-10a	Route 31 (Chalan Monsignor Guerrero)	Speed enforcement	-
SS-10b	Route 30 (Middle Road/Chalan Pale Arnold)	Speed enforcement	-
SS-11	Garapan	Parking enforcement	Planning/Design
SS-12	Garapan	Improve vehicle circulation	Planning/Design
SS-13	Route 30 (Middle Road/Chalan Pale Arnold)	Hazard elimination	Planning/Design
SS-14	Route 306 (Chalan Tun Joaquin Doi) & Texas Road	Add signage	-
SS-15	Route 38 (Navy Hill Road), near CHCC	Construct pedestrian facilities and bike lanes	-
SS-16	Route 302 (Naftan Road), from Route 304 (Flame Tree Road) to Obyan Route 33 (Beach Road)	Improve roadway	-
SS-17	Route 323 (Industrial Drive), from Smiling Cove Road to Lower Base Drive	Improve roadway	-

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Paper Size ANSI A

0 2,250 4,500

Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

Commonwealth of the Northern Mariana Islands
20 - Year Highway Master Plan

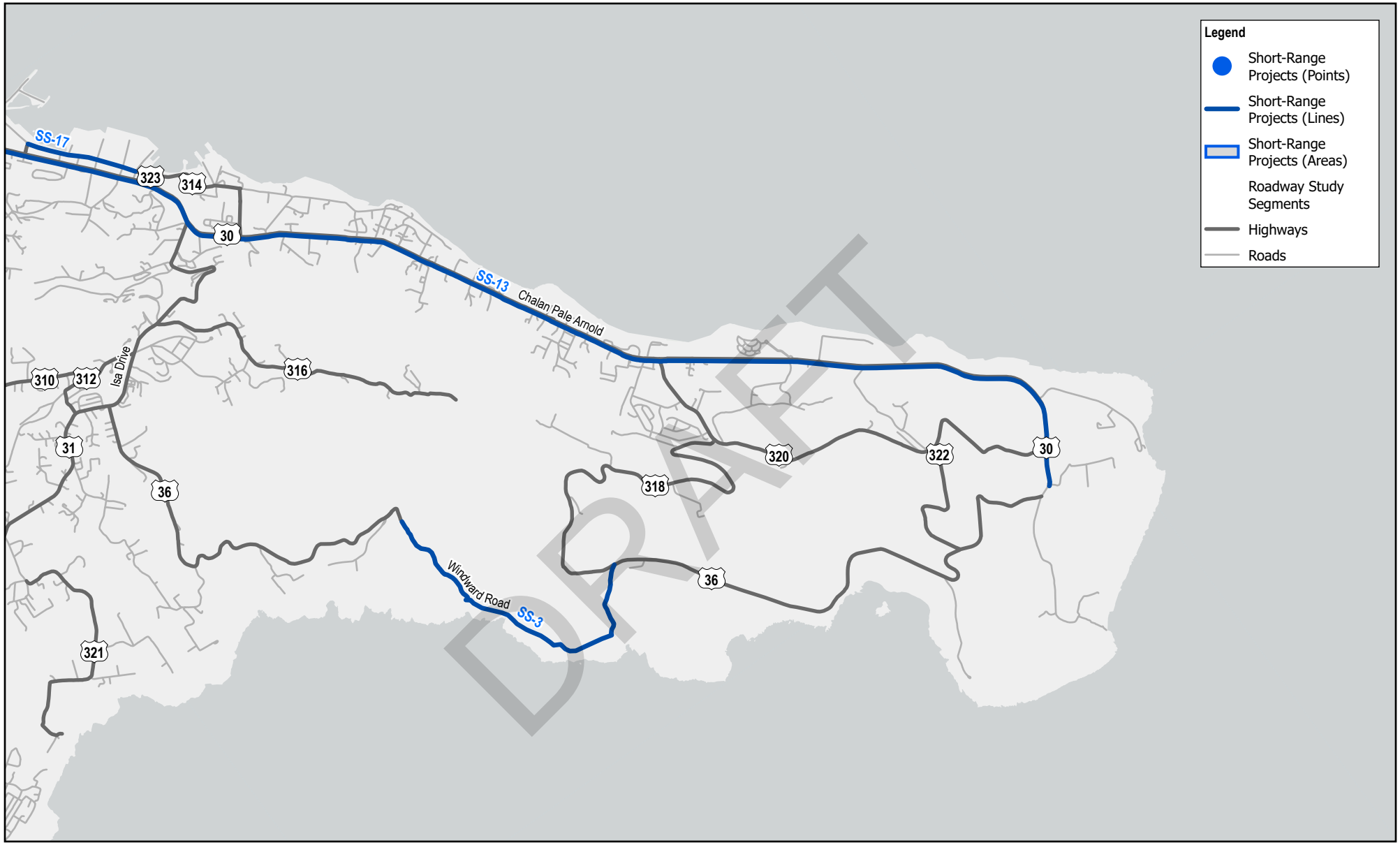
SAIPAN NEAR-TERM RECOVERY CONDITIONS IMPROVEMENTS

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

FIGURE 6-1

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_FIG 601_Saipan Near-Term Recovery Conditions Improvements
Print date: 27 Jul 2022 - 13:38

Data source: Light Gray Base: BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, METI/NASA, USGS; Roads: TIGER, 2020. Created by: pthornton



Paper Size ANSI A

0 2,250 4,500

Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

Commonwealth of the Northern Mariana Islands
20 - Year Highway Master Plan

SAIPAN (NORTH) NEAR-TERM RECOVERY CONDITIONS IMPROVEMENTS

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

FIGURE 6-2

\\ghdnet\ghd\US\Sacramento - 2200 21st\Projects\561\11224010\GIS\Maps\Deliverables\11224010_CNMI_20_YR_2022\11224010_CNMI_20_YR_2022.aprx - 11224010_FIG 602_Saipan (North) Near-Term Recovery Conditions Improvements
Print date: 27 Jul 2022 - 13:39

Data source: Light Gray Base: BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, METI/NASA, USGS; Roads: TIGER, 2020. Created by: pthornton

SS-1 Intersection Modifications

SS-1 Intersection Modifications are planned for the existing signalized or stop-controlled intersection locations, described below.

SS-1a Route 31 (Chalan Monsignor Guerrero) and Route 30 (Middle Road/Chalan Pale Arnold): *Planning/Design Stage*

SS-1b Route 31 (Chalan Monsignor Guerrero) and Route 33 (Beach Road): *Planning/Design Stage*

SS-1c Route 30 (Middle Road/Chalan Pale Arnold) and Route 38 (Navy Hill Road): *Planning/Design Stage*

> *Intersection modifications have been planned of this location. However, other projects included in this plan recommend multimodal infrastructure on Micro Beach Road connecting to Middle Road/Chalan Pale Arnold and Navy Hill Road, and continuing east on Navy Hill Road by the Commonwealth Healthcare Center. Multimodal improvements should be incorporated into intersection modification design at this location.*

SS-1d Route 33 (Beach Road) and Route 308 (Garapan Street): Improve Traffic Signal

The signalized T-intersection at Beach Road and Garapan Street is located in Garapan. Garapan Street is one of the key streets connecting Middle Road/Chalan Pale Arnold and Beach Road. The northbound right-turn traffic and westbound traffic are substantially high at this intersection based on field observations. To facilitate the northbound right-turn and westbound right-turn movements at the intersection, it is recommended to provide overlap right-turn phases for these movements. With the overlap phases, the northbound right-turn movement will run concurrently with the westbound left-turn movement, and the westbound right-turn will run simultaneously with southbound left-turn movement.

In addition to the signal operation, much of the striping at this intersection including the crosswalks have faded and are not clearly visible to drivers and pedestrians. New striping on top of slurry seal or a black painted background beneath the stripes that could greatly enhance the visibility of the pavement markings at the intersection is recommended.

> *This traffic signal could be upgraded with video detection to actuated signal phases and increase the operational efficiency of the intersection (see Project SL-12).*

Photo 6-15 Existing Intersection (Southbound View)



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SS-1e Route 35 (Tun Herman Pan Road) and Route 304 (Flame Tree Drive): Modify from Two-Way to All-Way Stop-Control

The intersection of Tun Herman Pan Road and Flame Tree Drive was listed as one of the high accident frequency locations in the previous master plan study. Tun Herman Pan Road is a key roadway providing access to the airport and Flame Tree Drive connects to a residential area and is also a back road to the airport. This location is currently unsignalized with stop-sign control on Flame Tree Drive. The Department of Public Safety identified that the problem at the location is that drivers from the stop-controlled Flame Tree Drive have difficulty finding gaps in the traffic to turn onto the uncontrolled Tun Herman Pan Road. A feasible near-term solution is to modify the two-way stop-controlled intersection to a four-way stop-control. Installation of a traffic signal is not recommended at this time as signal warrants could not be met under the existing condition; however, traffic signal should be considered in the future when traffic volumes increase and the signal warrants are met. Figure 6-2(E) below shows an aerial photograph and recommended improvements of the intersection.

Photo 6-16 Existing Condition: Route 35 – Northbound Approach

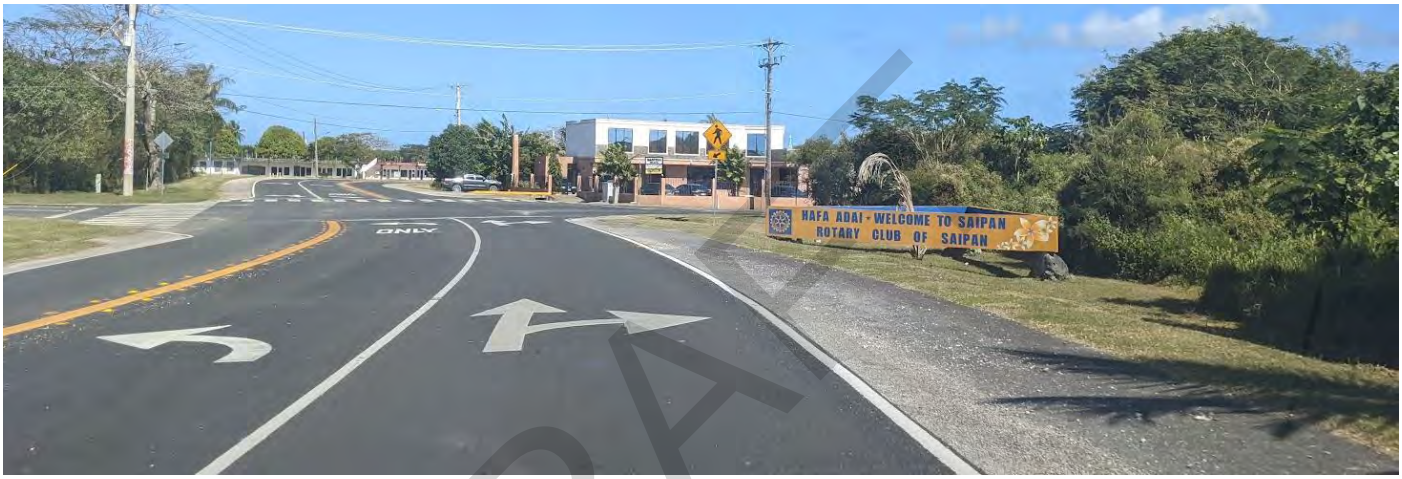


Illustration 6-5 SS-1e Location



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In addition, Route 304 south of Route 35 transitions abruptly for southbound traffic. Improvements should aim to ensure road widening and/or striping clearly designates lane boundaries.

Photo 6-17 Existing Condition: Route 304 – Southbound View of Eastbound Approach



SS-1f Route 33 (Beach Road) and Route 37 (Chalan Monsignor Martinez): Modify from Yield to Two-Way Stop-Control

The T-intersection at Route 33 (Beach Road) and Route 37 (Chalan Monsignor Martinez) is currently yield-sign controlled on Chalan Monsignor Martinez. According to the information provided by Department of Public Safety, vehicles from Chalan Monsignor Martinez usually exit the roadway without stopping usually create a hazardous condition to vehicles on Beach Road. In order to improve the safety to vehicles on Beach Road, introducing stop control on Chalan Monsignor Martinez and improving roadway delineation at the intersection are recommended. These proposed improvements could prevent vehicles from entering Beach Road without stopping and could provide a better guidance to traffic accessing the intersection.

Illustration 6-6 SS-1f Location



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SS-1g Route 304 (Flame Tree Road) and Route 32 (As Perdido Road): Modify from Two-Way to All-Way Stop-Control

The intersection of Route 304 and Route 32 is currently two-way stop-controlled at the northbound/southbound approaches. The steep grade at the eastbound approach along Route 32 creates visibility issues, as shown in Figure 6-2(G). Converting the intersection to all-way stop-control could address safety concerns associated with visibility.

Photo 6-18 Existing Condition: Southbound Approach



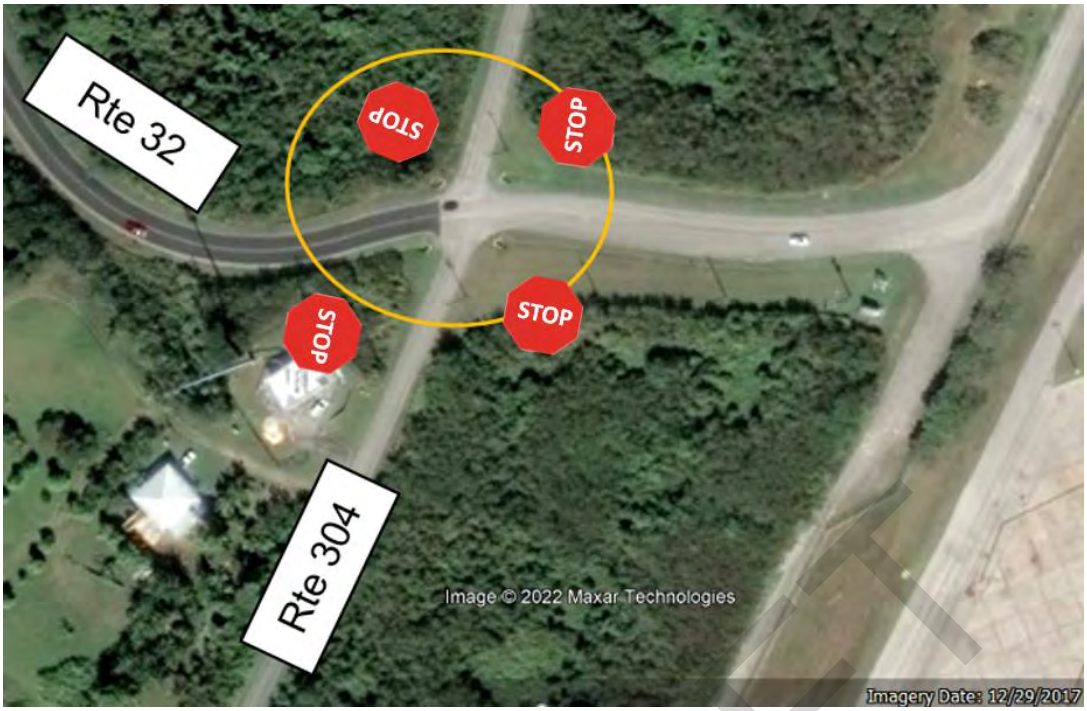
Photo 6-19 Existing Condition: Eastbound Approach



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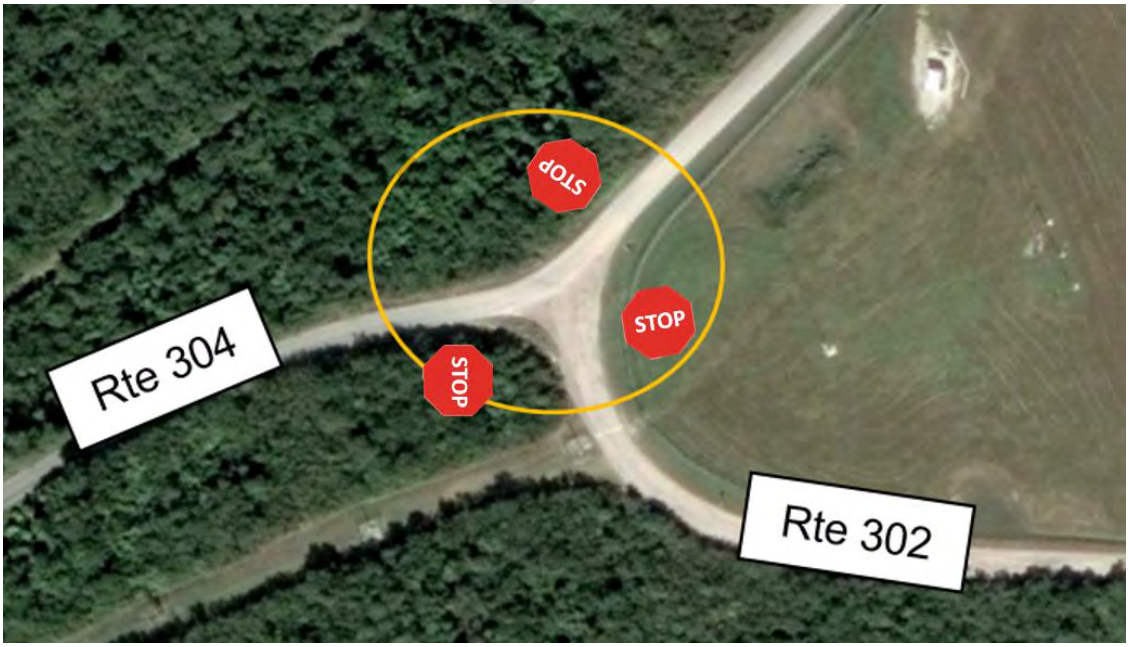
Illustration 6-7 SS-1g Location



SS-1h Route 304 (Flame Tree Road) and Route 302 (Naftan Road): Modify from Yield to All-Way Stop-Control

The intersection of Route 304 and Route 302 is currently yield-sign controlled. Due to overgrown shrubs and the approach curbs, it is difficult to see approaching vehicles. Converting the intersection to two-way or all-way stop-control could address safety concerns associated with visibility, as shown in Figure 6-2(I). This plan recommends modification to all-way stop-control.

Illustration 6-8 SS-1h Location



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SS-2 New Traffic Signal or Roundabout

New traffic signals or roundabouts are planned for the following intersection locations, described below.

SS-2a Route 33 (Beach Road) & Route 315 (Quartermaster Road): *Under Construction*

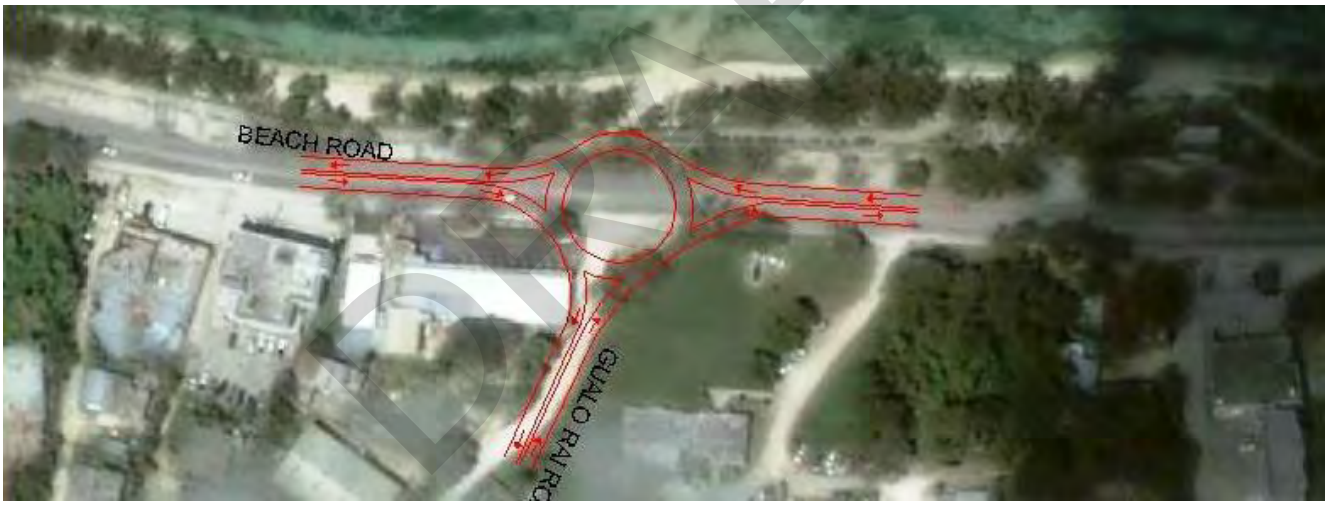
SS-2b Route 33 (Beach Road) & Route 317 (Gualo Rai Road): Traffic Signal or Roundabout

The intersection of Route 33 (Beach Road) and Route 317 (Gualo Rai Road) is currently an unsignalized intersection with stop-sign control at the westbound approach on Gualo Rai Road. There is one travel lane on Beach Road in each direction, but there is no turn lane.

A project to pave, realign, and improve Gualo Rai Road is proposed by the Department of Public Works. This project is expected to be implemented in the next five years. Once this substantial roadway, Gualo Rai Road, is improved, it is expected that more traffic will use this intersection to travel between Beach Road and Middle Road/Chalan Pale Arnold. Signalization of this intersection should be considered after the improvements are implemented.

An alternative option of constructing a roundabout at this location was also evaluated for both the existing and future year conditions. The analysis results revealed that a single-lane roundabout would be adequate to accommodate both the Near-Term and Long-Term traffic volumes at Beach Road and Gualo Rai Road. The illustration below shows a conceptual layout of a single lane roundabout with a 100-foot diameter inscribed circle and a 15-foot circulating lane at the location. Constructing a roundabout at this location would require acquiring the landscaped area on the west side of Beach Road, the northeast corner, and the parcel on the southeast corner of the intersection.

Illustration 6-9 SS-2b Concept



SS-2c Route 33 (Beach Road) and Route 319 (CPL Derence Jack Road): New Traffic Signal or Roundabout

The intersection of Route 33 (Beach Road) and Route 319 (CPL Derence Jack Road) is in the heart of Garapan. On the northeast corner of this intersection are the Garapan Elementary School and other commercial and retail businesses. CPL Derence Jack Road (previously called Orchard Street) is the primary access to the Fiesta and Hyatt Regency Hotels. Pedestrian activities are very high with the majority of pedestrian being tourists.

This intersection is currently unsignalized with stop-sign control on the eastbound and westbound approaches on CPL Derence Jack Road. Vehicle turning movements were observed to be high at this location, especially the left turn movements. Due to the high volumes on Beach Road and high pedestrian activities at this intersection, vehicles on CPL Derence Jack Road are queued during the peak hours. Intersection analysis results revealed that the intersection is currently operating at an unacceptable LOS F and is also projected to operate at LOS F in Long-Term (2040).

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Signalization of this intersection would provide signalized pedestrian crossings in all directions, which would enhance traffic safety for students, tourists, and reduce vehicle delays. As mentioned in the previous section, this intersection could potentially meet the school area and pedestrian warrants for installation of a traffic signal in the existing condition. It is recommended that a signal warrant analysis to be completed to justify signal installation. *Although an intersection improvement at this location is currently in the Planning/Design stage, this plan recommends further evaluating the potential of a roundabout.*

The following images provide examples of existing conditions and depicts a conceptual layout of a single-lane roundabout with an 80-foot diameter inscribed circle at this location.

Photo 6-20 Existing Condition: Route 33 (Beach Road) – Southbound View



Illustration 6-10 SS-2c Roundabout Concept Diameter



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SS-2d Route 33 (Beach Road) and Route 38 (Micro Beach Road): New Traffic Signal or Roundabout

Route 33 (Beach Road) terminates in the north at Route 38 (Micro Beach Road). The westbound volumes, vehicles coming from the intersection of Middle Road/Chalan Pale Arnold and Micro Beach Road, are high as this is the principal route for the motorists to access Garapan from the northern areas of the island (north of Route 38 (Navy Hill Road)). The surrounding land uses include open spaces (American Memorial Park), a fire station, commercial and retail resulting in moderate pedestrian activity. The intersection was calculated to operate at LOS B in both Near-Term and Long-Term traffic conditions.

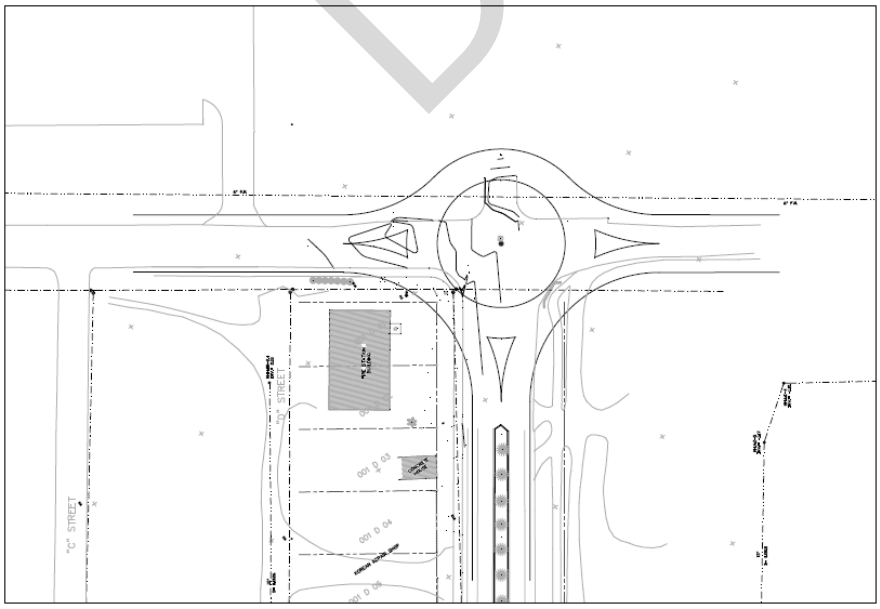
Although an intersection improvement at this location is currently in the Planning/Design stage, this plan recommends further evaluating the potential of a roundabout.

Photo 6-21 Existing Intersection – Southbound View



Conversion of this intersection to roundabout control is recommended at this location. Consistent with current revitalization efforts in the Garapan area, roundabouts will balance traffic flow with reduced vehicular travel speeds, encouraging safer pedestrian activity.

Illustration 6-11 SS-2d Concept



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SS-2e Route 31 (Chalan Monsignor Guerrero) and Route 305 (DanDan Road) & Proas Lane

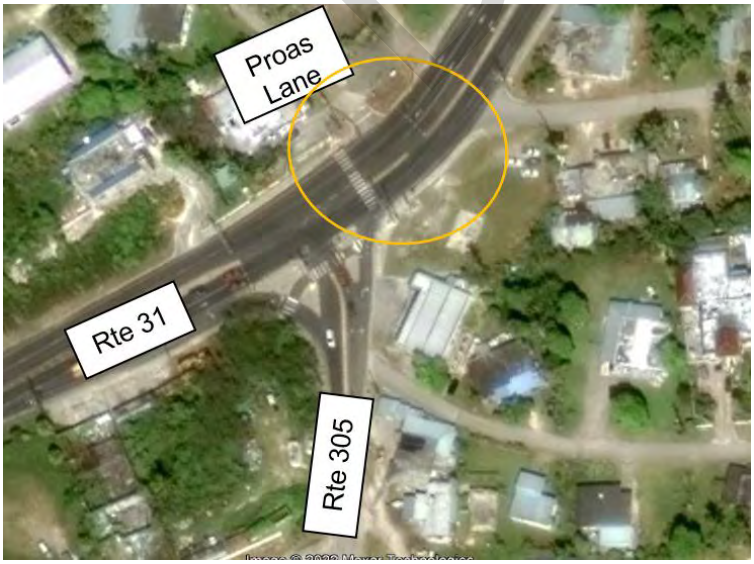
The intersection of Route 31 and Route 305 is currently a leg-leg signalized intersection. However, there are closely spaced driveways immediately adjacent to this traffic signal causes, specifically at Proas Lane which allows left-turns out of the driveway onto Chalan Monsignor Guerreo (see Figure 6-2(R)). The project would reconfigure the intersection include the approach at Proas Lane and require modifications to the existing traffic signal at Route 31 and Route 305.

An alternative option of constructing a roundabout at this location was also considered. A roundabout could be an ideal solution, but additional design would be required to determine if a roundabout could be accommodated at this location.

Photo 6-22 Existing Condition



Illustration 6-12 SS-2e Location



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Photo 6-23 Existing Condition – View of Proas Lane



SS-2f Route 31 (Chalan Monsignor Guerrero) and Route 37 (Chalan Monsignor Martinez)

The intersection of Route 31 and Route 37 is currently a three-leg traffic signal located just west of the Route 31 intersection with Route 35. Due to the close spacing of these major intersections, improvements need to be coordinated to ensure proper operations. To improve access along the corridor and improve safety, this intersection could be a candidate for roundabout installation, subject to additional design study. Alternatively a retimed coordinated signal system with the Route 35 intersection is proposed with improved signal hardware to improve motorist safety.

Photo 6-24 Existing Condition



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Illustration 6-13 SS-2f Location



SS-2g Route 31 (Chalan Monsignor Guerrero) and Route 35 (Tun Herman Pan)

The intersection of Route 31 and Route 35 is currently a three-leg traffic signal located just east of the Route 31 intersection with Route 37. Due to the close spacing of these major intersections, improvements need to be coordinated to ensure proper operations. If a roundabout design is selected for the Route 37 intersection, a traffic signal at this location may not operate optimally and intersection reconfiguration will need to be considered, including relocation of the intersection or realignment of Route 35 to intersect either Route 37 or 31 at an alternate location.

Photo 6-25 Existing Condition



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Illustration 6-14 SS-2g Location



SS-2h Route 32 (As Perdido Road) and Route 37 (Chalan Monsignor Martinez)

The intersection of Route 32 and Route 37 is currently a four-leg traffic signal. A roundabout is recommended at this location. Roundabouts provide efficient traffic control while minimizing the turn conflicts associated with vehicular movements at a traffic signal. The improvement would include a new four-leg single-lane roundabout.

Illustration 6-15 SS-2h Location



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SS-6 Add pedestrian pathway on Route 38 (Micro Beach Road)

Route 38 (Micro Beach Road) links Beach Road with Middle Road/Chalan Pale Arnold and provides a vital transportation connection between two of the most important roads on Saipan. It is recommended that pedestrian paths be provided to enhance the walkability of both Micro Beach Road and Garapan. An existing pedestrian pathway is located on the west side of Middle Road/Chalan Pale Arnold between Industrial Drive and Micro Beach Road. Extending this existing pedestrian pathway to connect to Beach Road would improve pedestrian safety and attract more usage of these alternatives to driving.

Photo 6-26 Existing Condition: Missing Sidewalk/Pedestrian Pathway



Photo 6-27 Existing Condition: Missing ADA Curb Ramps at Intersections (at Middle Road/Chalan Pale Arnold)



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Photo 6-28 Existing Condition: Missing Sidewalk/Pedestrian Pathway



Illustration 6-16 SS-6 Location



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SS-8 Lighting Improvements in Garapan

Street and pedestrian-level lighting are recommended along roadways within the Garapan area. Providing lighting on a roadway at night improves the visibility of the roadway and its immediate environment.

Consistent with current revitalization efforts in Garapan, the goal of this improvement is to encourage pedestrian activity by providing additional lighting. Current efforts to improve the Garapan area include changes to the circulation and a comprehensive upgrade to pedestrian facilities. These improvements should be supplemented with pedestrian lighting. Pedestrian lighting specifically shines light on the sidewalk and is important to include in street design along with roadway lighting.

Photo 6-29 Existing Condition: View of Garapan – Southbound View on Route 33 (Beach Road)



SS-9 Add mid-block or signalized crosswalks on Route 33 (Beach Road)

Several roadway segments on Route 33 (Beach Road) have been identified as high pedestrian activity locations where no or inadequate pedestrian crosswalks are currently available. These locations include Route 317 (Gualo Rai Road) and Route 315 (Quartermaster Road), and south of Route 31 (Chalan Monsignor Guerrero) near the high school and the sports field. Pedestrians were often observed crossing the road outside the designated pedestrian crossing area because crosswalks are not available within a reasonably short walking distance. It is suggested evaluating safe and suitable locations for either mid-block crossings or signalized crosswalks on Beach Road to enhance pedestrian and vehicle safety. Advance pedestrian crossing warning signs should be installed on the roadway in conjunction of the crosswalk installation to alert drivers of the pedestrian crossing ahead.

SS-10 Speed enforcement & safety improvements on Route 31 (Chalan Monsignor Guerrero) (10a) and Route 30 (Middle Road/Chalan Pale Arnold) (10b)

The 2008 Highway Master Plan reported that two roadway segments on Saipan have vehicles traveling at high and unsafe speed. These roadway segments are Route 31 (Chalan Monsignor Guerrero) between Route 30 (Middle Road/Chalan Pale Arnold) and Route 37 (Chalan Monsignor Martinez), and Middle Road/Chalan Pale Arnold north of Lower Base. The respective speed limits on Route 31 and Route 30 are 40 mph and 35 mph. Vehicles traveling at an unsafe high speed on these segments could be hazardous to other drivers and also pedestrians.

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Collision Data

Route 31 (Chalan Monsignor Guerrero) and Route 30 (Middle Road/Chalan Pale Arnold) were identified as priority corridors for safety improvements based on the 2017 collision data presented in an earlier chapter of this report. Specifically, of the total five (5) fatal collisions that occurred in 2017, three (3) of those occurred along Route 31 between Chalan Pale Arnold to Chalan Msgr. Martinez at the following intersections:

- Chalan Monsignor Guerrero & Chalan Antionio Apa
- Chalan Monsignor Guerrero & Kannat Tabla Drive
- Chalan Monsignor Guerrero & Rayao Loop

In addition, of the intersections with the highest total number of collisions in 2017, three (3) intersections were located along Route 31, as shown in the following table.

Table 6.5 Route 31 Priority Intersections

Intersection	# Collisions
Chalan Monsignor Guerrero & Kannat Tabla Drive	**18**
Chalan Monsignor Guerrero & Beach Road	**16**
Chalan Monsignor Guerrero & Chalan Pale Arnold	**16**

Based on collision rates for total or fatal + injury collisions, Route 30 had two (2) segments within the top 10 (S-12 and S-13), and one segment (S-11) with a fatal collision.

Table 6.6 Route 30 Priority Segments

Segment ID	Segment	Location	# Collisions	# Injury Collisions	# Fatal Collisions	Rate Rank (Total)	Rate Rank (Fatal + Injury)
S-11	Middle Road/Chalan Pale Arnold	Isa Drive to Micro Beach Road	**38**	6	1	32	19
S-12	Middle Road/Chalan Pale Arnold	Micro Beach Road to Gualo Rai Road	**129**	15	-	8	8
S-13	Middle Road/Chalan Pale Arnold	Gualo Rai Road to Quartermaster Road	**86**	14	-	9	4

Of the total collisions involving a pedestrian, five (5) occurred on Route 31 and three (3) occurred on Route 31. Of those collisions, most results in injuries and one (1) resulted in a fatality.

Table 6.7 Collisions Involving a Pedestrian

Intersection	2017 Collisions	
	Injuries	Fatalities
Chalan Pale Arnold, east of Saluda Street	**1**	
Chalan Pale Arnold & Gobietno Drive	**1**	
Chalan Pale Arnold & Cheribiyan Drive	**1**	
Chalan Pale Arnold & Europa Place	**3**	
Chalan Pale Arnold & Micro Beach Road	**2**	
Chalan Monsignor Guerrero & Kannat Tabla Drive		**1**
Chalan Monsignor Guerrero, east of Rasimu Lane		
Chalan Monsignor Guerrero & Tanduki Drive	**1**	

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Recommendation

While the 2017 collision data did not include information regarding the cause of the collision, such as speeding, speeding is understood to be a common occurrence on these roadways. One of the solutions to minimize the number of vehicles speeding on roadways is to increase the police coverage and enforcement in the particular speeding areas and giving out citations to speeding drivers. More frequent and regular police coverage is needed for more effective result.

In addition, installing speed limit signs together with radar speed signs could help alert drivers if their driving speed is over speed limit). The image below provides an example of a solar-powered radar speed sign system that has been widely used on roadways. This device detects the speed of an approaching vehicle by radar and displays the vehicle speed on the digital display. The vehicle speed display would flash if is the approaching vehicle is speeding.

Photo 6-30 Speed Limit Feedback Sign Example



Additional Considerations for Route 31

The Northern Marians College Community Enhancement Plan includes improvements for the portion of Route 31 (Chalan Monsignor Guerrero) between the Airport Road traffic signal and the crest of As Terlaje hill. Improvements include protected sidewalks, lighting, landscaping, bicycle facilities, several pedestrian crosswalks, and a pedestrian bridge near Dahon Drive. This plan will assist in addressing existing safety issues along Route 31, and similar improvements should be considered for additional portions of the roadway. A roundabout at Route 37 would complement this improvement well, and may allow reduction in travel lanes to accommodate additional travel modes.

Photo 6-31 Northern Marianas College Community Enhancement Plan



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SS-13 Hazard Elimination along Route 30 (Middle Road/Chalan Pale Arnold)

Although aspects of this project are currently in the Planning or Design phase, this plan makes additional recommendations to evaluate safety needs along the corridor. Middle Road/Chalan Pale Arnold, specifically segments S-12 and S-13 between Micro Beach Road and Quartermaster Road, had some of the highest collision rates for both total and fatal + injury collisions in 2017 (see Table 6.8). As Middle Road/Chalan Pale Arnold is one of the busiest major corridors on the island, it is very important that a well maintained and safe roadway is provided to the users. Therefore, as a goal to enhance safety of this corridor, it is recommended that, as one of the short-term improvements on Saipan, a hazard elimination program be established for Middle Road/Chalan Pale Arnold.

Table 6.8 Route 30 (Middle Road/Chalan Pale Arnold) Collision Rates (Segments S-12 & S-13)

			2017 Collisions				Total Fatal + Injury	
Study Segment	Road Name	Location	Total #	Non-Injury	Injury	Fatal	Rate Rank	Rate Rank
S-12	Route 30 (Middle Road/Chalan Pale Arnold)	Route 38 (Micro Beach Road) to Route 317 (Gualo Rai Road)	**129**	114	15	-	8	8
S-13	Route 30 (Middle Road/Chalan Pale Arnold)	Route 317 (Gualo Rai Road) to Route 315 (Quartermaster Road)	**86**	72	14	-	9	4

Photo 6-32 Existing Condition: Poorly Defined Driveways along Route 30



Photo 6-33 Existing Condition: Lack of Sidewalk



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SS-14 Add signage at the intersection of Route 306 (Chalan Tun Joaquin Doi) and Texas Road

The intersection of Route 306 and Texas Road lacks signage to notify travelers of their location. On Saipan, the highways are generally marked with route signage, and the intersections include directional signage. This improvement recommends adding route signage to the intersection of Route 306 and Texas Road.

Additional recommendations include traffic calming measures along Route 306 approaching the intersection from the east (westbound approach). Route 306 transitions from a rural highway into an urban area without any distinguishing signage to signify the changing roadway characteristics.

Photo 6-34 Existing Conditions: Eastbound Approach



Photo 6-35 Existing Conditions: Route 306 Westbound – Approaching the Intersection with Texas Road





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Illustration 6-17 SS-14 Location



SS-15 Construct multimodal facilities on Route 38 near CHCC near Route 30 (Middle Road/Chalan Pale Arnold)

Route 38 south of Route 30 (Middle Road/Chalan Pale Arnold) provides access to the Commonwealth Healthcare Corporation (CHCC). Existing conditions do not include adequate pedestrian or bicycle facilities along the roadway nor at the intersection. Improvements should aim to increase multimodal access, comfort, and safety for non-motorists traveling to the CHCC. Improvement SS-6 recommends a pedestrian pathway on Route 38 (Micro Beach Road) west of Middle Road/Chalan Pale Arnold. These improvements should continue east of Middle Road/Chalan Pale Arnold to connect to the healthcare center. Six-foot bike lanes on both sides of Middle Road/Chalan Pale Arnold would provide a safer facility for bicyclists. Providing pedestrian facilities and bike lanes along Middle Road/Chalan Pale Arnold would improve pedestrian and bicycle safety and attract more usage of these alternatives to driving.

Photo 6-36 Existing Condition: Missing Crosswalk at Route 38/Route 39 Intersection – Northbound View



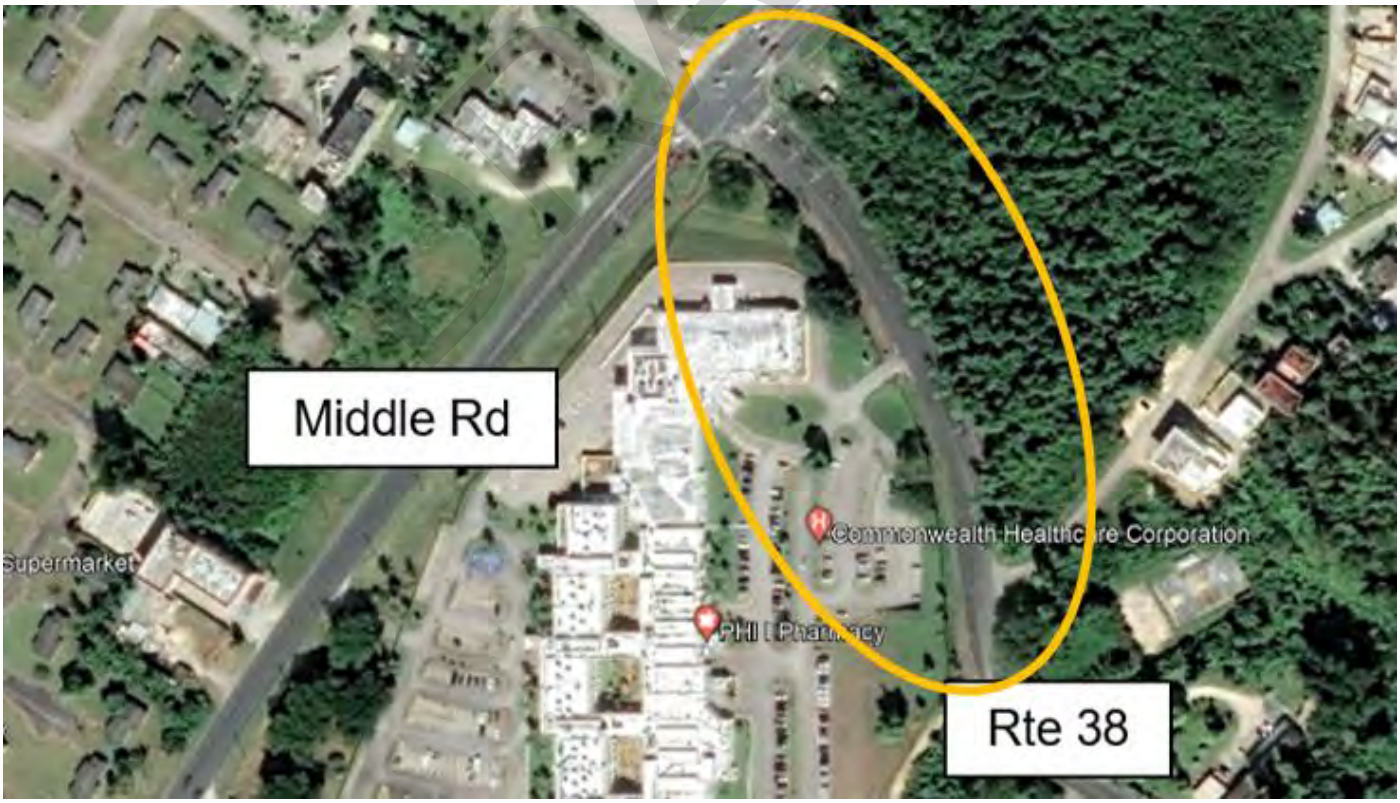
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Photo 6-37 Existing Condition: Aerial View of Intersection at Route 38 and Route 30 – Westbound View



Illustration 6-18 SS-15 Location



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SS-16 Improve Route 302 from Route 304 to Obyan Beach Road

Route 302 provides access to both the airport and Obyan Beach. The improvement includes paving the roadway to standard conditions. Upgrades include widening the roadway in some segments to provide enough right-of-way for two vehicles to pass each other; paving the roadway to enhance drivers' comfort and increase travel speed; installing new pavement, warning signs along winding and curved sections of the road; striping and pavement delineation devices along the route, and installing new barriers and drainage system.

Photo 6-38 Existing Condition: Unpaved Route 302



Illustration 6-19 SS-16 Location



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SS-17 Improve Route 232 (Industrial Road) from Smiling Cove Road to Lower Base Drive

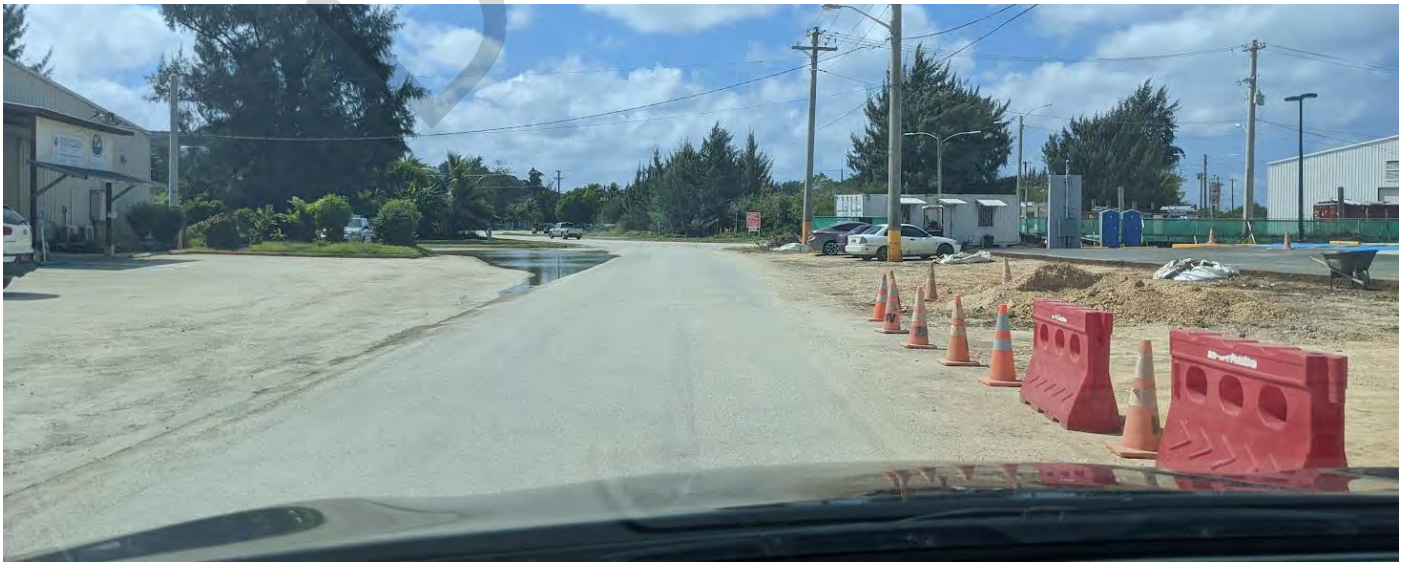
The port in Saipan is critical to the island and the industrial area adjacent to Industrial Road. Existing conditions include portions of unpaved roadway, minimal roadway markings, and narrow roadway widths. In addition, the roadway currently has drainage challenges due to uneven pavement conditions, causing water to pool on the roadway or adjacent to it. The improvement includes upgrading existing paved segments and paving the unpaved sections to standard conditions. The pavement condition, pavement markings, crosswalk striping and signage along the entire corridor should be maintained and repaired regularly. Visible warning and regulatory signs including speed enforcement signs should be installed upstream of pedestrian crosswalks, curves, and lane-drop areas to give advance warning to drivers of any changes in roadway conditions.

In addition, considering that this area serves visitors from ships, multimodal facilities should be considered along Industrial Road. Lighting should also be improved as it was a concern noted in the public comments for this plan.

Photo 6-39 Existing Condition



Photo 6-40 Existing Condition



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20Illustration 6-21 SS-17 Location



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6.3.2 Saipan Long-Term (2040) Improvements

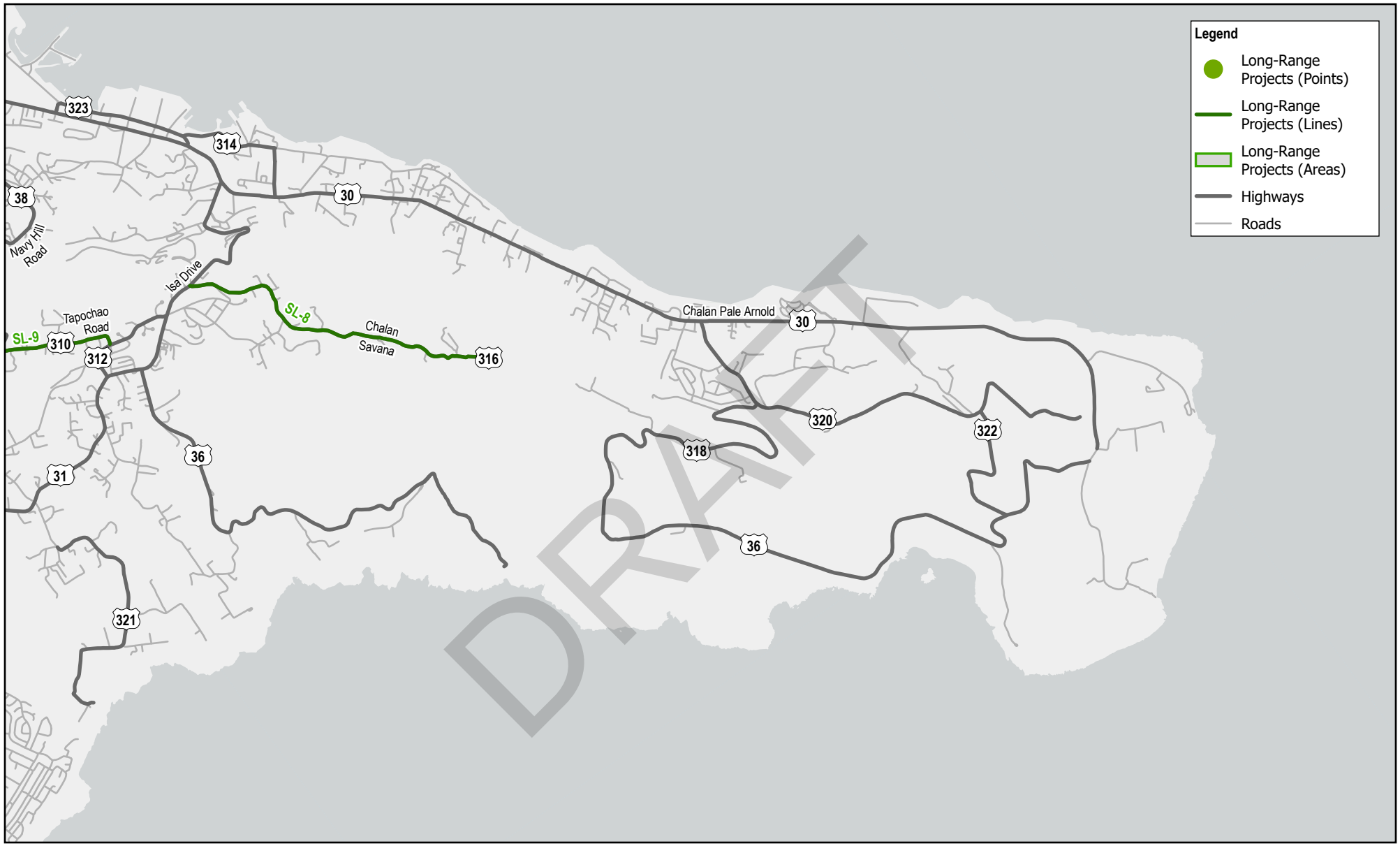
The long-term improvements for Saipan are listed below and shown in Figure 6-3. Descriptions for each improvement are provided on the following pages.

Table 6.9 Saipan Long-Term (2040) Improvements

ID	Location	Improvement	Project Stage
Saipan			
SL-1	Route 30 (Middle Road/Chalan Pale Arnold) & Monsignor Guerrero	Realign Texas road to form a 4-legged intersection	-
SL-2	Route 38 (Micro Beach Road), between Route 33 (Beach Road) and Route 30 (Middle Road/Chalan Pale Arnold)	Realign Micro Route 33 (Beach Road)	-
SL-3	Route 38 (Micro Beach Road), between Route 33 (Beach Road) and Route 30 (Middle Road/Chalan Pale Arnold)	Add bike lanes	-
SL-4	Route 38 (Micro Beach Road), between Route 33 (Beach Road) and Route 30 (Middle Road/Chalan Pale Arnold)	Add pedestrian pathway	-
SL-5	Route 30 (Middle Road/Chalan Pale Arnold)	Construct pedestrian facilities and bike lanes	-
SL-6	Route 31 (Chalan Monsignor Guerrero), near Route 35 (Tun Herman Pan)	Drainage upgrade	-
SL-7	Route 33 (Beach Road), from Route 31 (Chalan Monsignor Guerrero) to Afetna	Widen roadway, install two-way left-turn lane	-
SL-8	Route 316 (Chalan Savanna)	Widen and pave roadway	Planning/Design
SL-9	Route 310 (Tapochao Road) towards Mt. Tapochao	Upgrade and improve roadway	Planning/Design
SL-10	Beach Road Parkway	Replace piers	-
SL-11	Route 33 (Beach Road), from Route 31 (Chalan Monsignor Guerrero) to Gualo Rai Road	Coastal reinforcement	-
SL-12	Route 33 (Beach Road), from Route 38 (Micro Beach Road) to Koblerville Road	Corridor signal optimization	-
SL-13	Route 30 (Middle Road/Chalan Pale Arnold), from Route 38 (Micro Beach Road) to QuaRoutermaster Road	Corridor signal optimization	-

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Paper Size ANSI A

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Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

Commonwealth of the Northern Mariana Islands
20 - Year Highway Master Plan

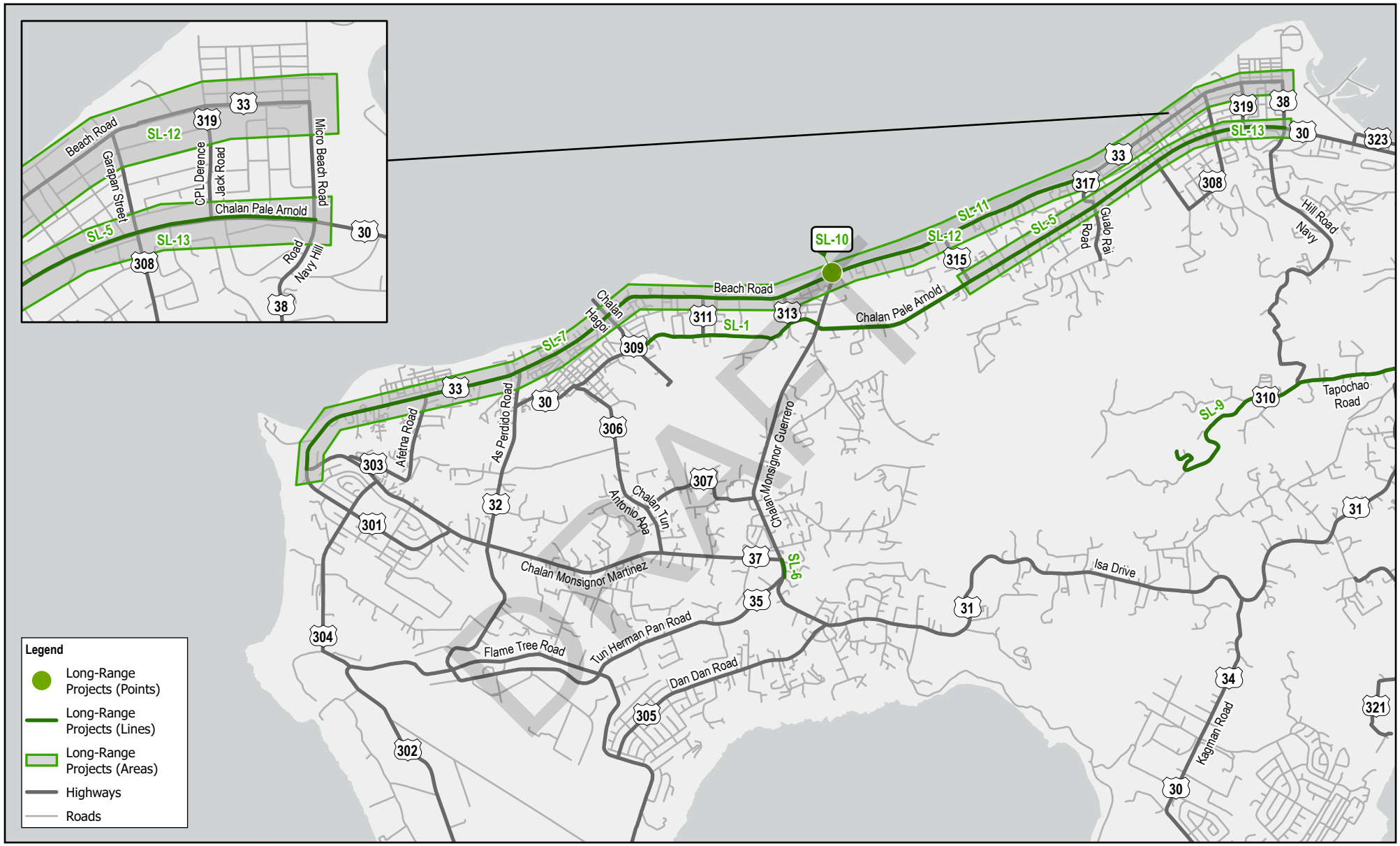
SAIPAN (NORTH) LONG-TERM (2040) IMPROVEMENTS

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

FIGURE 6-4

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Data source: Light Gray Base: BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, METI/NASA, USGS; Roads: TIGER, 2020. Created by: pthornton



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Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

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SAIPAN LONG-TERM (2040) IMPROVEMENTS

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

FIGURE 6-3

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Data source: Light Gray Base: BECQ, Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, METI/NASA, USGS; Roads: TIGER, 2020. Created by: pthornton

SL-1 Realign Route 306 (Chalan Tun Joaquin Doi) and modify Intersection with Route 30 (Middle Road/Chalan Pale Arnold) and Route 31 (Chalan Monsignor Guerrero) to a four-leg intersection

Improvement SL-1 was previously SL-3 in the 2008 Highway Master Plan.

Route 33 (Beach Road) currently is the main access to areas in southwest Saipan and is expected to serve forecasted traffic demand increases. Alternatives to Beach Road are limited especially in the southern section of Saipan near Susupe, Chalan Kanoa and San Antonio. An alternative to provide an alternative route to Beach Road in the Susupe and Oleai areas would be to upgrade and extend Chalan Tun Joaquin Doi and create a new four leg intersection at Route 31 (Chalan Monsignor Guerrero) and Route 30 (Middle Road/Chalan Pale Arnold). If implemented, this circulation upgrade would relieve the traffic demands along Beach Road south of Chalan Monsignor Guerrero and reduce the turning demands at the Beach Road and Monsignor Guerrero intersection.

This recommendation requires the realignment and upgrade of the existing Chalan Tun Joaquin Doi resulting in some right-of-acquisition and the modification of the existing Chalan Monsignor Guerrero and Middle Road/Chalan Pale Arnold intersection to a four-legged intersection. The existing Chalan Monsignor Guerrero and Middle Road/Chalan Pale Arnold intersection would be modified to include a south leg (for northbound traffic movements). With these improvements traffic signal phasing would be revised to include additional phases for the northbound movements. Traffic signal operations at Chalan Monsignor Guerrero and Middle Road/Chalan Pale Arnold are expected to remain at acceptable service levels. Chalan Tun Joaquin Doi would be upgraded to include a minimum of two 12-foot lanes (one in each direction) with 6-foot shoulders that could be used as bike lanes. A sidewalk or pedestrian pathway should also be included as the current land uses along Chalan Tun Joaquin Doi are residential which would generate pedestrian and bicycle activity.

This additional north-south roadway would be used as an extension of Middle Road/Chalan Pale Arnold south of Chalan Monsignor Guerrero reducing the traffic demands along Beach Road and the segment of Chalan Monsignor Guerrero between Beach Road and Middle Road/Chalan Pale Arnold. Improved traffic operations along Beach Road would result and an additional access route to the areas of Susupe, Chalan Kanoa, and San Antonio would be available.

Illustration 6-22 SL-1 Location



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Illustration 6-23 SL-1 Location



SL-2/SL-3/SL-4 Realign Route 38 (Micro Beach Road) between Route 33 (Beach Road) and Route 30 (Middle Road/Chalan Pale Arnold) (SL-2). Widen roadways to provide a third lane that would become a westbound left-turn lane and add bike lanes (SL-3). Add pedestrian pathway on Micro Beach Road (SL-4).

These improvements were previously all included in SL-4 in the 2008 Highway Master Plan.

Route 38 (Micro Beach Road) links Route 33 (Beach Road) with Route 30 (Middle Road/Chalan Pale Arnold) and provides a vital transportation connection between two of the most important roads on Saipan. Given the high levels of traffic on Micro Beach Road, the addition of a third lane that also functions as a WB left turn lane at the intersection with Beach Road, would add capacity on the road and at the intersection. Given the current pavement width is approximately 26 feet, the third lane could be provided with the addition of approximately 12 feet of pavement.

Micro Beach Road links Beach Road with Middle Road/Chalan Pale Arnold and provides a vital transportation connection between two of the most important roads on Saipan. The addition of bicycle lanes on Micro Beach Road would connect those already provided or being recommended on Beach and Middle Road/Chalan Pale Arnold, enhancing the usability of those lanes and the island's cycle network. It is recommended that pedestrian paths be provided to enhance the walkability of both Micro Beach Road and Garapan. Six-foot bike lanes on both sides of Micro Beach Road would provide a safer facility for bicyclists. Providing pedestrian facilities and bike lanes along Micro Beach Road would improve pedestrian and bicycle safety and attract more usage of these alternatives to driving.

Figure 6-4(C) illustrates the recommended roadway improvements on Micro Beach Road. Figure 6-4(D) shows the lack of pedestrian facilities and relatively scarce amount of roadway side development along Micro Beach Road.

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Illustration 6-24 SL2, 3 & 4 Location



Photo 6-41 Existing Condition



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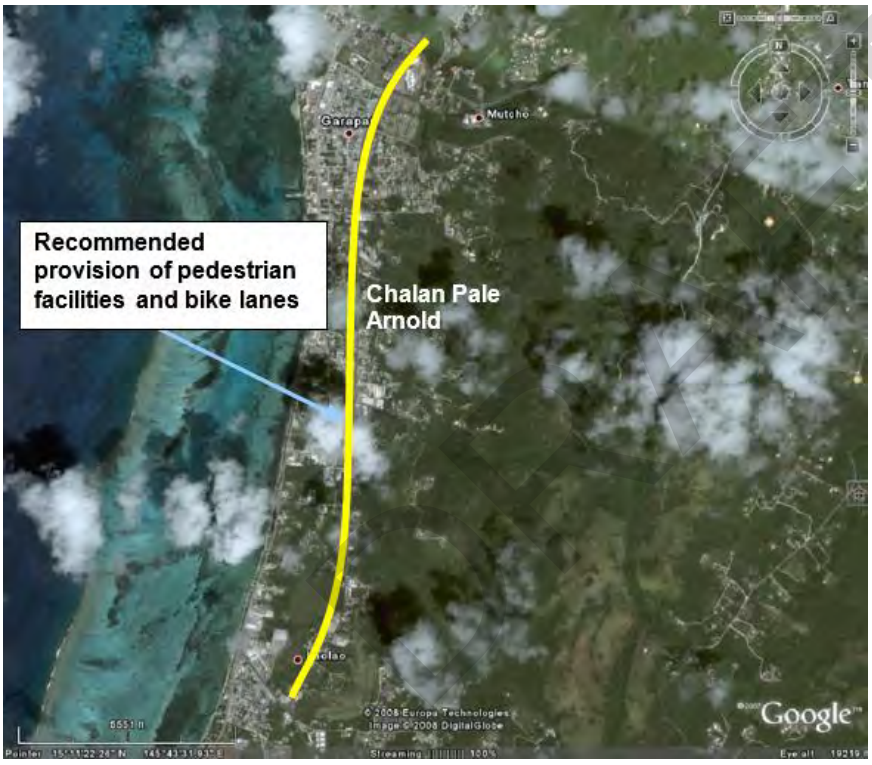
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SL-5 Construct multimodal facilities along Route 30 (Middle Road/Chalan Pale Arnold)

Route 30 (Middle Road/Chalan Pale Arnold), also referred to a Middle Road/Chalan Pale Arnold, is the principal thoroughfare for Saipan serving the largest traffic demands and provides vital connections to other primary routes on the island. Unfortunately, adequate pedestrian and bicycle facilities are not provided along Middle Road/Chalan Pale Arnold. Land uses along Middle Road/Chalan Pale Arnold vary and include residential, commercial, retail and office. Pedestrian activity and bicycling could be substantial if non-motorized circulation was enhanced and made safer with a sidewalk and bike lanes.

At a minimum a single sidewalk is recommended along the east side of Middle Road/Chalan Pale Arnold where more available right-of-way exists and power is available to provide lighting the new sidewalk. There are existing street lights along the majority of Middle Road/Chalan Pale Arnold on the eastern side. Six-foot bike lanes on both sides of Middle Road/Chalan Pale Arnold would provide a safer facility for bicyclists. Providing pedestrian facilities and bike lanes along Middle Road/Chalan Pale Arnold would improve pedestrian and bicycle safety and attract more usage of these alternatives to driving.

Illustration 6-25 SL-5 Location



SL-6 Drainage upgrade along Route 31 (Chalan Monsignor Guerrero) near Chalan Tun Herman Pan Road

Route 31 (Chalan Monsignor Guerrero) near Chalan Tun Herman Pan Road is in need of drainage improvements as the road currently has potholes that decrease the safety of drivers especially during monsoon season. The road should be repaved and the drainage improved.

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Illustration 6-26 SL-6 Location



SL-7 Widen Route 33 (Beach Road) from Route 31 (Chalan Monsignor Guerrero) to Afetna to install two-way left-turn lane

According to the accident data and accident rate analysis, the roadway segment between Route 31 (Chalan Monsignor Guerrero) and Afetna Road on Route 33 (Beach Road) is one of the high accident rate locations.

In order to improve the safety of this roadway segment on Beach Road, it is recommended providing a two-way left-turn lane (TWLTL) on Beach Road between Chalan Monsignor Guerrero and Afetna to allow easier turn movements of vehicles into and out of the driveways. This could be done by widening Beach Road and restripe the travel lanes to include a TWLTL in the middle. Eliminating the right-angle commercial parking spaces and introducing designated commercial parking lots are also recommended to eliminate any conflict between the backing vehicles and vehicles traveling on Beach Road.

SL-8 Widen and improve Route 316 (Chalan Savana)

Improvement SL-8 was previously SL-10 in the 2008 Highway Master Plan.

Route 316 connects the residential areas located to the north and central parts of the islands to Isa Drive and the rest of the island. Apart from the short paved segment where it meets Isa Drive, the rest of the route is unpaved, bumpy, and practically requires a four-wheel vehicle for safe traveling. The roadway surface is uneven and contains hazards such as potholes, rocks, and standing water. In some segments the roadway is very narrow and two vehicles cannot adequately pass each other while moving at a safe speed. Usually one vehicle has to pull over and stop while the other vehicle passes with caution at a slow speed. During a rain or if the route is wet, travel is even more difficult due to the standing water and potholes filling up with water.

This roadway needs to be upgraded and paved. Upgrades include widening the roadway in some segments so that two vehicles can pass each other or at a minimum providing wider vehicle pullout areas for passing of slower traffic, installing new asphaltic concrete pavement, new pavement markings, roadside signage, new barriers, and drainage system.

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SL-9 Upgrade and improve Route 310 towards Mt. Tapochao

Route 310 provides connectivity to Isa Drive for the residential areas located south of Isa Drive. It terminates in the south at Mt Tapochao. The roadway condition of Route 310 is similar to that of Route 316. The majority of the route is an unpaved dirt road, bumpy, narrow, and requires a four-wheel vehicle for safe traveling. Two opposing vehicles may not be able to travel comfortably on some segments of the corridor. This condition is especially hazardous to drivers along winding and steep segments of the road where sight distance is limited.

To provide a safer and comfortable condition to drivers, the roadway needs to be upgraded and paved. Upgrades include widening the roadway in some segments to provide enough right-of-way for two vehicles to pass each other; paving the roadway to enhance drivers' comfort and increase travel speed; installing new pavement, warning signs along winding and curved sections of the road; striping and pavement delineation devices along the route, and installing new barriers and drainage system.

SL-10 and SL-11 Replace piers and implement Coastal reinforcement on Route 33 (Beach Road) from Route 31 (Chalan Monsignor Guerrero) to Route 317 (Gualo Rai Road)

The Beach Road Parkway is a major attraction on the island of Saipan. CNMI should reinforce the t-head groins along the pedestrian walkway.

Photo 6-42 Beach Roadway Parkway



SL-12 and SL-13 Corridor signal optimization along Route 33 (Beach Road) and Route 30 (Middle Road/Chalan Pale Arnold)

This improvement aims to address the operational deficiencies along Route 33 (Beach Road) and Route 30 (Middle Road/Chalan Pale Arnold). In lieu of widening the roadway, which in some areas has already been widened, this improvement involves optimizing the traffic signals along the length of the entire corridor. Traffic signals should be upgraded with video detection via cameras to allow actuated signal timing. Due to the humidity of the climate on the island, signal hardware often becomes damaged which results in using default pretimed signal phases. Actuated signal timing improves the operational efficiency of the intersection.

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6.4 Tinian Improvements

Tinian is served by a roadway network in which the majority was constructed in the mid 20th Century (War World II) era by the United States Government (US). Most of the principal roadways are in decent or servable condition whereas other highly used routes are in poor condition but not in the Territorial Highway System. As demand grows on the Tinian roadway network, repairs, modifications, and improvements to the highway system will be needed. Potential transportation modifications, upgrades and improvements are identified based on comments from the project's informational meeting, discussions with DPW staff on traffic and safety issues and operations, and field investigations and observations. These recommendations are intended to maintain and improve Tinian's circulation for both vehicles and pedestrians and bicyclists, reduce potential circulation impacts while maintaining the local natural environment, and provide future capacity and facilities to meet the growing needs on Tinian.

To maintain the mobility on the islands, the identified improvements are divided into long-term and near-term recommendations. The designated timeframe for long-term improvements would be from 5 to 10 years whereas the designated timeframe for near-term recommendations would be from 0 to 4 years. Long-term recommendations are improvements or upgrades that may be on a larger scale and take a longer time period to implement or modifications that are not immediately necessary but should be implemented to maintain the mobility on the islands. Near-term improvements are modifications and upgrades that should be implemented due to their critical nature or are on a smaller scale and could be implemented in a shorter timeframe.

Proposed long and near-term improvements recommended for Tinian and shown in Figure 6-5. Detailed discussions of each recommendation is presented on the following pages.

6.4.1 Tinian Near-Term Recovery Conditions Improvements

The near-term improvements for Tinian are listed below and described on the following pages.

Table 6.10 Tinian Near-Term Recovery Conditions Improvements

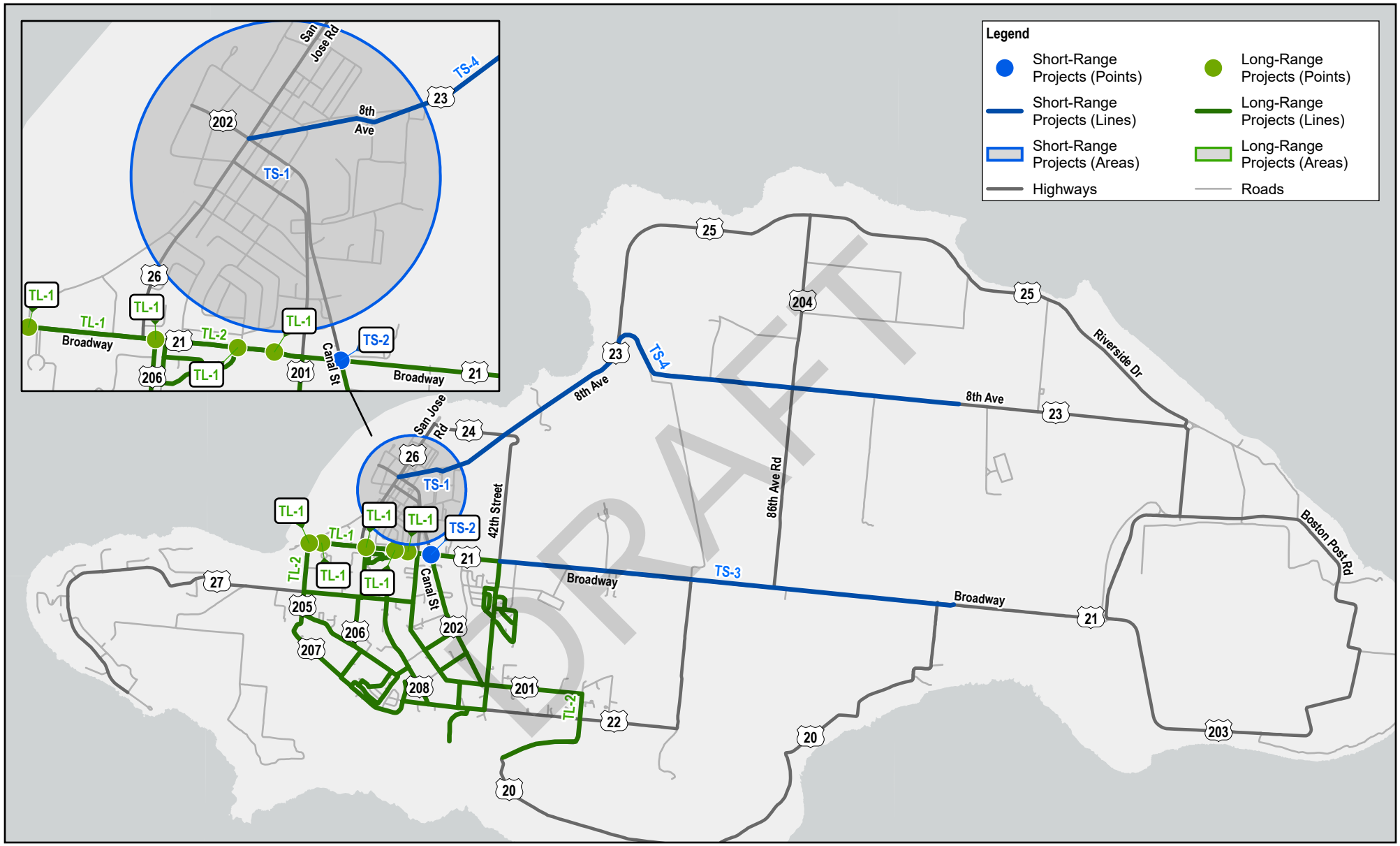
ID	Location	Improvement	Project Stage
Tinian			
TS-1	Tinian, especially in San Jose Village	Implement directional and guide sign program	-
TS-2	Route 21 (Broadway) & Canal Street	Fix roundabout	-
TS-3	Route 21 (Broadway), from Route 201 to Military Retention Zone	Improve roadway	-
TS-4	Route 23 (8th Avenue), from Route 202 to Military Retention Zone	Improve roadway	-

TS-1 Implement directional and guide sign program on Tinian especially in San Jose Song Village

There are very few existing directional and guide signs on Tinian. For unfamiliar travelers on Tinian finding various points of interests, districts, communities or land uses can be frustrating, confusing and time consuming. Tinian has various attractions and destinations but driving to them is difficult due to the lack of directional and guide signage unless you are a resident or familiar with Tinian. Even in San Jose Village finding a destination can be difficult since the street layout is not in a typical street block network.

Directional and guide signs would enhance the driver experience and eliminate confusion especially for visitors and unfamiliar motorists. Popular attractions, such as the resorts, beaches, harbor, island areas, and airport should be signed better.

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Paper Size ANSI A

0 1,500 3,000 4,500 6,000

Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

Commonwealth of the Northern Mariana Islands
20 - Year Highway Master Plan

TINIAN NEAR AND LONG-TERM IMPROVEMENTS

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

FIGURE 6-5

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Print date: 27 Jul 2022 - 13:45

Data source: Light Gray Base: Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, METI/NASA, USGS; Highways, Roads: TIGER, 2020. Created by: pthornton

TS-2 Improve existing roundabout at Route 21 (Broadway) and Canal Street

Sight distance issues with the existing roundabout at Route 21 (Broadway) and Canal Street were identified during public outreach efforts. Specifically, the line of sight at the northbound approach is obstructed by a raised concrete plater box and plants located within the median. In addition, the roundabout should be redesigned following professional best practices and guidelines to improve approach lane alignments for safer travel through the intersection.

Photo 6-43 Existing Roundabout



Photo 6-44 Improvement Recommendation



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TS-3 & TS-4 Improve Route 21 (Broadway) and Route 28 (8th Avenue) to Military Retention Zone

Route 21 (Broadway) and Route 28 (8th Avenue) connect villages on Tinian to the Military Retention Zone to the north. Military and construction heavy equipment and oversized vehicles impact the roadway, which is currently undersized and in poor condition. Existing pavement conditions on these roadways are poor (see example image).

Photo 6-45 Existing Pavement Condition on Route 21 (Broadway)



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6.4.2 Tinian Long-Term (2040) Improvements

The long-term improvements for Tinian are listed below and described on the following pages.

Table 6.11 Tinian Long-Term (2040) Improvements

ID	Location	Improvement	Project Stage
Tinian			
TL-1	Broadway, from Route 201 south to Limestone Forest Trail	Upgrade and improve roadway	-
TL-2	Lower Pina, Marpo and Carolinas	Upgrade and improve major roadways	-

TL-1 Upgrade and improve Route 21 (Broadway) from Route 201 south to Limestone Forest Trail

Improvement TL-1 was previously TL-2 in the 2008 Highway Master Plan.

Broadway is the principal highway and serves the highest vehicle demands on Tinian. Access to the Airport and the most direct connection to San Jose Village is via Broadway. Broadway is a divided highway with an approximate 30 foot, landscaped median separating north and southbound traffic from Route 201 north to the roundabout at the Hinode America Memorial. The current geometrics and layout of Broadway north of Route 201 (2 lane divided highway) provides a safer facility (due to its separation of opposing traffic) and scalability (right-of-way for increasing capacity). Broadway is the most critical corridor on Tinian and it should be upgraded and improved to maintain it as the central transportation corridor for north-south travel and as the intersection of other island routes.

Upgrades and modifications for Broadway are necessary to continue its mobility capacity and street network connections. Improving Broadway would allow it to serve as the principal highway and corridor for Tinian. Future access along Broadway should also be limited to prevent an overstation of driveways, intersections and streets that would impact operations and safety on Broadway. Recommended improvements and upgrades for Broadway:

– Continue the two-lane, divided alignment of Broadway from Route 201 south to intersection just south of the Tinian Dynasty Hotel and Resort.
– Realign several intersections on Broadway (T intersections) that are within 100 feet of another T intersection along Broadway. These roadways access residential areas and should be realigned to form four leg intersections. Access control along Broadway to limit vehicles accessing Broadway.
– Upgrade the intersection with Routes 201 and 202 to provide delineated left-turn pockets with a minimum length of 100 feet and a standard transition from the through lanes.
– Install positive traffic control or barriers (possibly metal beam guard rail) along curves, fixed objects, and/or intersection corners to eliminate potential vehicle conflicts and incidents.
– Maintain the two-lane, divided alignment on Broadway to provide a safer facility and allow for future roadway capacity increases.

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Figure 6-6(E) TL-1 Recommended Improvements



TL-2 Upgrade and improve major roadways in Lower Pina, Marpo and Carolinas

Improvement TL-2 was previously TL-3 in the 2008 Highway Master Plan.

As summarized earlier in the report, some of the roadways around the Lower Pina and around Marpo and Carolinas are proposed to be included in the roadway classification system of the island due to a new casino development in Lower Pina area and the expected population growth in Marpo and Carolinas. Since the majority of these roadways are currently narrow or unpaved local facilities, upgrades and improvements are necessary in order to bring these roadways up to the standard of the proposed roadway classification and therefore are recommended to be included as one of the long-term improvement plans for the island of Tinian.

The recommended roadway upgrades and improvements include right-of-way acquisitions to widen the roadways according to the roadway classification assigned, installing new pavement and new pavement striping and markings, installing new warning and regulatory signs, upgrading draining facilities along the roadways, and upgrading intersections along the roadways.

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6.5 Rota Improvements

Overall, the existing circulation and mobility on Rota is uncongested with moderate demands (see Chapter 4 for current traffic operations on Rota). Traffic counts were conducted on Rota as well as other information that included comments from the project's informational meeting, discussions with DPW staff on traffic and safety issues and operations, and field investigations and observations. These recommendations are intended to maintain and improve circulation, increase safety for pedestrians, bicyclists and motorists, reduce potential impacts that impact circulation while maintaining the local natural environment, and provide for the future.

To maintain the mobility on the islands, the identified improvements are divided into long-term and near-term recommendations. The designated timeframe for long-term improvements would be from 5 to 10 years whereas the designated timeframe for short term recommendations would be from 0 to 4 years. Long-term recommendations are improvements or upgrades that may be on a larger scale and take a longer time period to implement or modifications that are not immediately necessary but should be implement to maintain the mobility on the islands. Near-term improvements are modifications and upgrades that should be implemented due to their critical nature or are on a smaller scale and could be implemented in a shorter timeframe.

Figure 6-6 illustrates some of the specific near-term and long-term improvements for the island of Rota. Detailed discussions of each recommendation is presented on the following pages.

6.5.1 Rota Near-Term Recovery Conditions Improvements

The near-term improvements for Rota are listed below and described on the following pages.

Table 6.12 Rota Near-Term Recovery Conditions Improvements

ID	Location	Improvement	Project Stage
Rota			
RS-1	Rota, especially in Songsong Village	Implement directional and guide sign program	-
RS-2	Route 10	Hazard elimination	Ongoing
RS-3	Route 100, from Bay breeze Restaurant to East Harbor entrance	Install positive traffic control	-
RS-4	Route 10, within Sinapalo	Lighting improvement	-
RS-5	Route 10 & Route 100	Sidewalk	-

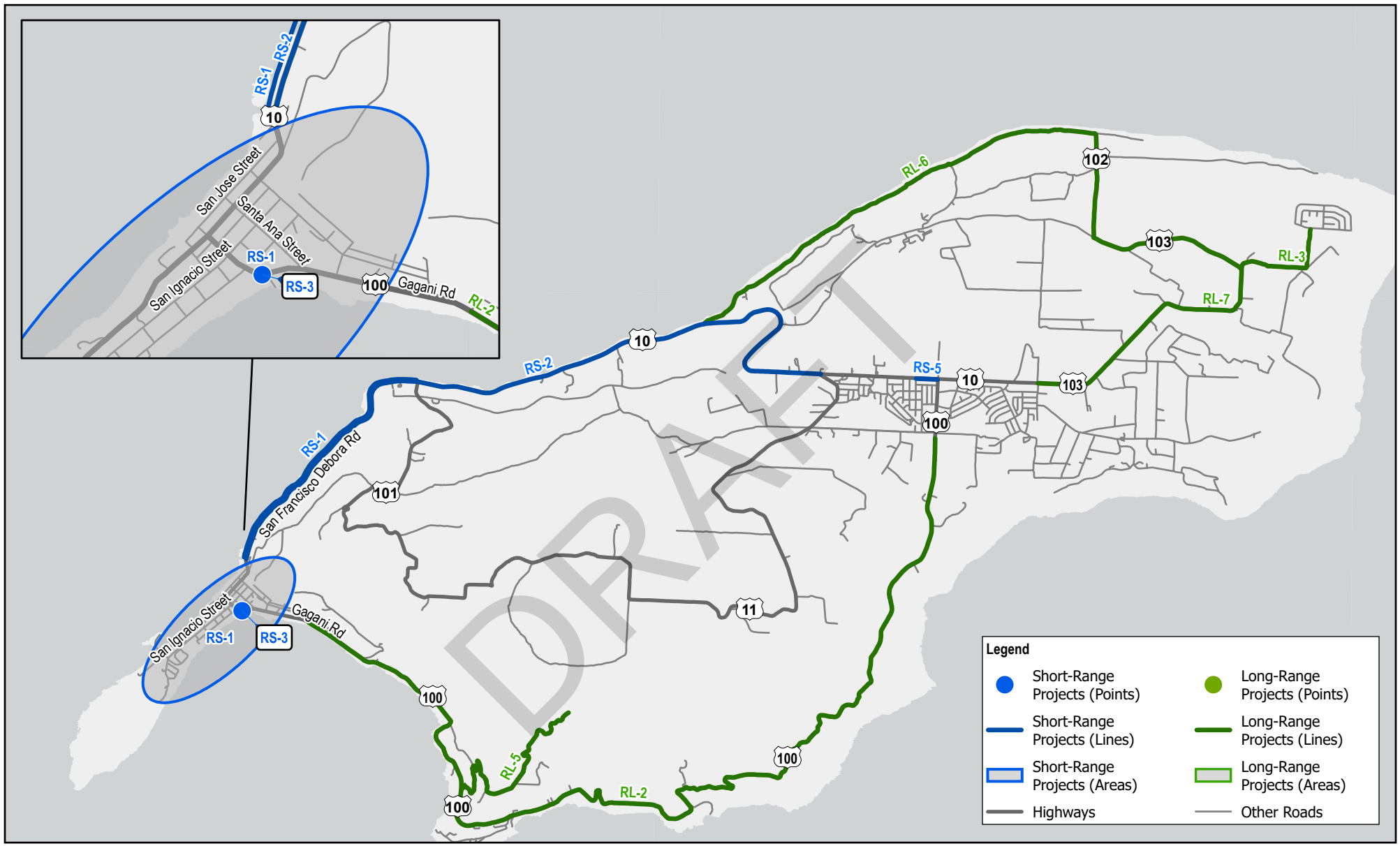
RS-1 Implement directional and guide sign program on Rota especially in Song Song Village

The existing roadways on Rota are unsigned and not clearly designated. Very few guide signs exist along Route 1 or other routes. Non-residents or motorists who are unfamiliar with Rota's roadways may become lost, disorientated, and/or frustrated when driving on the island. While driving on Rota, for a motorist unfamiliar with the roadway network, often times turns to additional routes and local roadways will be missed.

The roadway network on Rota needs to be inventoried and categorized. After the roadway network is designated for the type, names, and direction, a guide and directional street name sign program needs to be implemented. The street name sign program will aid in providing direction and reduce confusion for non-local drivers. A roadway signing program can assist in the identification of deficiencies and landmarks on the islands. In addition, the roadway identification and street name sign program additional roadway signs could be implemented to provide additional traffic controls, motorists warning and directions.

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0 1,500 3,000 4,500 6,000

US Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 MA11
Grid: NAD 1983 MA11 UTM Zone 55N

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Commonwealth of the Northern Mariana Islands
20 - Year Highway Master Plan

ROTA
NEAR AND LONG-TERM IMPROVEMENTS

Project No. **11224010**
Revision No. **-**
Date **Jul 2022**

FIGURE 6-6

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Print date: 27 Jul 2022 - 13:46

Data source: Light Gray Base: Esri, © OpenStreetMap contributors, HERE, Garmin, Foursquare, SafeGraph, METI/NASA, USGS; Highways, Roads: TIGER, 2020.
Created by: pthornton

RS-2 Hazard elimination on Route 10

Improvement RS-2 was previously RS-4 in the 2008 Highway Master Plan.

Route 10 is a two-lane undivided roadway located along the coastal area of the island. One of the hazardous situations along the route is sharp curves along the road with a lack of warning signs. This is especially dangerous along the narrow segments of the route. In addition to the curves and lack of signage, striping along the route is generally faded or does not exist.

Photo 6-46 Example of a Warning Sign on Route 10



To improve the safety of the route, it is recommended to reconstruct the roadway with superelevation at the curved segment of the roadway, pave the road with anti-skid asphaltic concrete pavement, and install advance curve warning signs, edge of pavement delineation devices to provide advance warning to drivers of changing roadway condition ahead. Concrete barriers or guardrails should be installed at the edge of curved roadways to prevent vehicles from running off the road. Installing new pavement markings, new center stripes and edge of pavement striping would also be a substantial upgrade to the roadway facility. The drainage system at flooded areas along the route should also be improved and upgraded.

RS-3 Install positive traffic control on Route 100 between the Bay Breeze Restaurant/Bar and East Harbor entrance

Along the eastbound direction of Route 100, approaching the access to East Harbor is a sharp curve just east of the Bay Breeze Restaurant/Bar. The entrance to the East Harbor is located on the curve. This is a hazardous situation as large vehicles will be accessing East Harbor and will have to maneuver along this tight roadway alignment. Compounding this hazardous situation is an existing power pole or fixed object along Route 100 without any advance warning signage or positive traffic protection (barriers). This location will potentially have a safety issue once the East Harbor improvement project is complete. Trucks will access the East Harbor and be required to navigate along this tight curve. Large vehicles will also have to maneuver past the existing power pole creating a high probability that that power pole will be hit or damaged. In addition, roadway lighting is not provided along the curve. The photo below shows a picture of the tight curve on Route 100 and the existing power pole right off the curve.

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Figure 6-8(A) RS-3 Recommended Improvements



The proposed improvement is to install a positive traffic control system such as a metal beam guard rail around the outside of the curve (eastbound direction) or at a minimum install advance warning signs and curve warning signs along the curves. A metal beam guard rail would prevent vehicles from driving off the curve (there is a drop off from Route 100 to the harbor) and protect the existing fixed object (power pole). Installation of advance warning signs and curve warning signs would also be a substantial upgrade to the existing roadway features. Highway lighting (a luminaire) should also be installed on the existing power pole to provide roadway lighting along the curve.

RS-4 Improve lighting and add pedestrian pathway along Route 10 in the Sinapalo Village

Street and pedestrian lighting and a pedestrian pathway are recommended for portions of Route 10 in the Sinapalo Village.

Figure 6-8(B) RS-4 Recommended Improvements



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6.5.2 Rota Long-Term (2040) Improvements

The long-term improvements for Rota are listed below and described on the following pages.

Table 6.13 Rota Long-Term (2040) Improvements

ID	Location	Improvement	Project Stage
Rota			
RL-1	Route 10, from Tatachok Point south to Pinatang Park	Drainage upgrade	-
RL-2	Route 100, from Songsong Village to Ginalahan Community and Airport	Complete, widen, and pave roadway	-
RL-3	Dugi area, from Route 103	Roadway extension, and other infrastructures to Dugi area	Planning/Design
RL-4a	Route 10	Construct bike/pedestrian path	-
RL-4b	Route 100	Construct bike/pedestrian path	-
RL-5	unnamed roadway, between Gagani and Haofna	Widen and upgrade roadway	-
RL-6	Route 102	Upgrade and pave roadway	-
RL-7	Route 103	Upgrade and pave roadway	-
RL-8	Alternate routes from Songsong Village to Sailigal Hulo and to Ka'an	Upgrade and pave roadways	-

RL-1 Drainage upgrade along Route 10 from Tatachok Point south to Pinatang Park

Segments of Route 10 approaching Song Song village from the Airport have poor drainage facilities that are resulting in maintenance issues (roadway pavement, erosion, and impacts to the natural environment due to the untreated runoff and erosions of the side slopes at the edge of the roadway). On the west side of Route 10 is the coastline and run off drains directly into the ocean. Erosion is also occurring along the roadway as the coastline encroaching on the roadway and in some areas eroding away at the edge of the roadway pavement section. Another impact is that this run off is untreated and threatens the natural environment by introducing toxins, pollution, and waste into the ocean and surrounding ecosystems. Eventually the untreated runoff will result in substantial impacts to the local beaches, coral reefs, indigenous animal and plant species and beauty of the environment.

Drainage facilities are needed along the roadways on Rota especially those roadways adjacent to the coastline such a Route 10 and Route 100. Drainage facilities should also include water and runoff treatment facilities such as natural detention basins and grassy swales to capture, detain, and treat the storm water runoff. This would reduce the amount of untreated runoff and pollution entering the ecosystem and reducing erosion along the highway.

RL-2 Complete, widen, and pave Route 100 from Song Song Village to Ginalahan Community and Airport

Improvement RL-2 was previously RL-3 in the 2008 Highway Master Plan.

Route 100 is paved east of Song Song Village for just over two miles then becomes a natural roadway approximately 0.2 miles before the Old Japanese Cannon. The highway becomes very narrow in some segments that maintain a travel-way width where only a single vehicle can proceed if there are two opposing vehicles. If two opposing vehicles happen to meet in one of these narrow segments, one of the vehicles must stop and pull over while the other vehicle proceeds to drive through. Route 100 also has narrow bridges that only allow a single direction of travel (i.e. a single vehicle) to proceed. Near the Japanese Cannon on the east side of the island, Route 100 also has visual erosion problems along the coastal edge of the highway. Proceeding northeast to the Ginalahan Community, the roadway also is uneven with substantial potholes and rocks. Travel on Route 101 east of Ponya Point is recommended to be traveled by four wheel drive vehicles. As development and growth occur, upgrades to Route 100 would be needed since it is the only east-west, coastal route in the southern and central parts of Rota.

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Photo 6-47 Existing Condition



RL-3 Expansion of roadway and other infrastructure to Dugi area from Route 103 in Gampapa and Pegnasu areas

Improvement RL-3 was previously RL-4 in the 2008 Highway Master Plan.

The development and expansion of the homestead lots in the vicinity of Dugi area in Rota could eventually be converted into primarily residential communities in the future, with corresponding rapid increases in population expected in the area. The Dugi area is mainly undeveloped with unpaved roads under the current condition. As the new developments occur in the future, the majority of the roadways and infrastructure in the area would require upgrades and improvements in order to meet the future demand. It is recommended that roadways connecting Route 103 in the Gampapa and Pegnasu areas to the Dugi area be widened and paved. As the development footprint becomes available in the future, the details and work involved in the expansion of roadways in the area should be evaluated and finalized.

RL-4a and RL-4b Construct bike/pedestrian path along Route 10 and Route 100

Improvements were previously both RL-5 in the 2008 Highway Master Plan.

As growth in tourism and visitor activities is expected on Rota due to future casino resorts and development, it is very important that a convenient and user-friendly pedestrian and bike network be established in key tourist areas on the island in order to attract tourists, visitors, and resident population. There are currently no pedestrian or bike paths on any of the major roadways on Rota. As an enhancement action, new pedestrian and bike paths should be considered along major roadways in Song Song Village, and along coastal roadways, Route 10 and Route 100. Since the introduction of new pedestrian and bike paths on existing roadways would require roadway widening and right-of-way acquisition, it is recommended that the implementation be prioritized and phased, and be coordinated with other roadway upgrade or improvement projects in the area.

RL-6 Widen and upgrade roadway connecting Gagani and Haofna

Improvement RL-6 was previously RL-7 in the 2008 Highway Master Plan.

The residents of Rota are depending on the main water source that supplies Song Song and Sinapalo Village. The transportation route between Gagani and Haofna is very important as this is the only roadway that CUC is using during check-up and maintenance of the main water source and distribution line. It is recommended that improvement

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of the roadway in the southern area from Gagani leading to Haofna be included as a long-term improvement plan for Rota. This roadway is also a potential route for eco-tours and aquaculture development.

The roadway improvements should include widening the roadway to allow two opposing vehicles to pass simultaneously; repaving the roadway surface, repairing and implementing preventative erosions; and implementing a roadway signing program for regulatory warning and guide signs.

RL-7 Upgrade and pave Route 102

Improvement RL-7 was previously RL-8 in the 2008 Highway Master Plan.

As the development and expansion of the homestead lots in the vicinity of the Dugi area in Rota occurs in the future and new roadways and infrastructure in the areas get upgraded and improved, Route 102 that potentially provides mobility between Dugi and the rest of the island along the coastline would require upgrades and improvements in order to accommodate the increased traffic in the future.

This route currently consists of narrow unpaved dirt roads with lanes wide enough for one vehicle at a time. The goal in the long-term is to widen and upgrade Route 102 to a standard two-lane roadway with 12-ft travel lanes and 4-ft shoulders in both directions as the development in Dugi area occurs. New concrete barriers, asphalt pavement, roadway signage and pavement markings and striping should be provided as the roads get widened. In addition, drainage facilities should also be constructed where runoff would be captured, detained and treated.

RL-8 Upgrade and pave Route 103

Improvement RL-8 was previously RL-9 in the 2008 Highway Master Plan.

Similar to Route 102, Route 103 is another potential roadway for providing mobility between Dugi and the rest of the island. Therefore, it would require upgrades and improvements in order to accommodate the increased traffic in the future. This route currently is a narrow unpaved dirt road with lanes wide enough for one vehicle to pass at a time. The goal in the long-term is to widen and upgrade Route 102 to a standard two-lane roadway with 12-ft travel lanes and 4-ft shoulders in both directions as the development in Dugi area occurs. New concrete barriers, asphalt pavement, roadway signage and pavement markings and striping should be provided as the roads get widened. In addition, drainage facilities should also be constructed where runoff would be captured, detained and treated.

RL-9 Upgrade and pave alternate routes from Song Song Village to Sailigal Hulo and Ka’an

Improvement RL-9 was previously RL-10 in the 2008 Highway Master Plan.

Rota currently has major paved roadways that connect the airport, Sinapalo and Song Song Village; however, these major transportation routes are mainly located along the coastal area of the island. Should there be a tsunami warning or alert, an alternate route should be provided to the public in Song Song village to access a safer place like Sinapola Village, Ka’an or another high level area. This alternate route is currently not available.

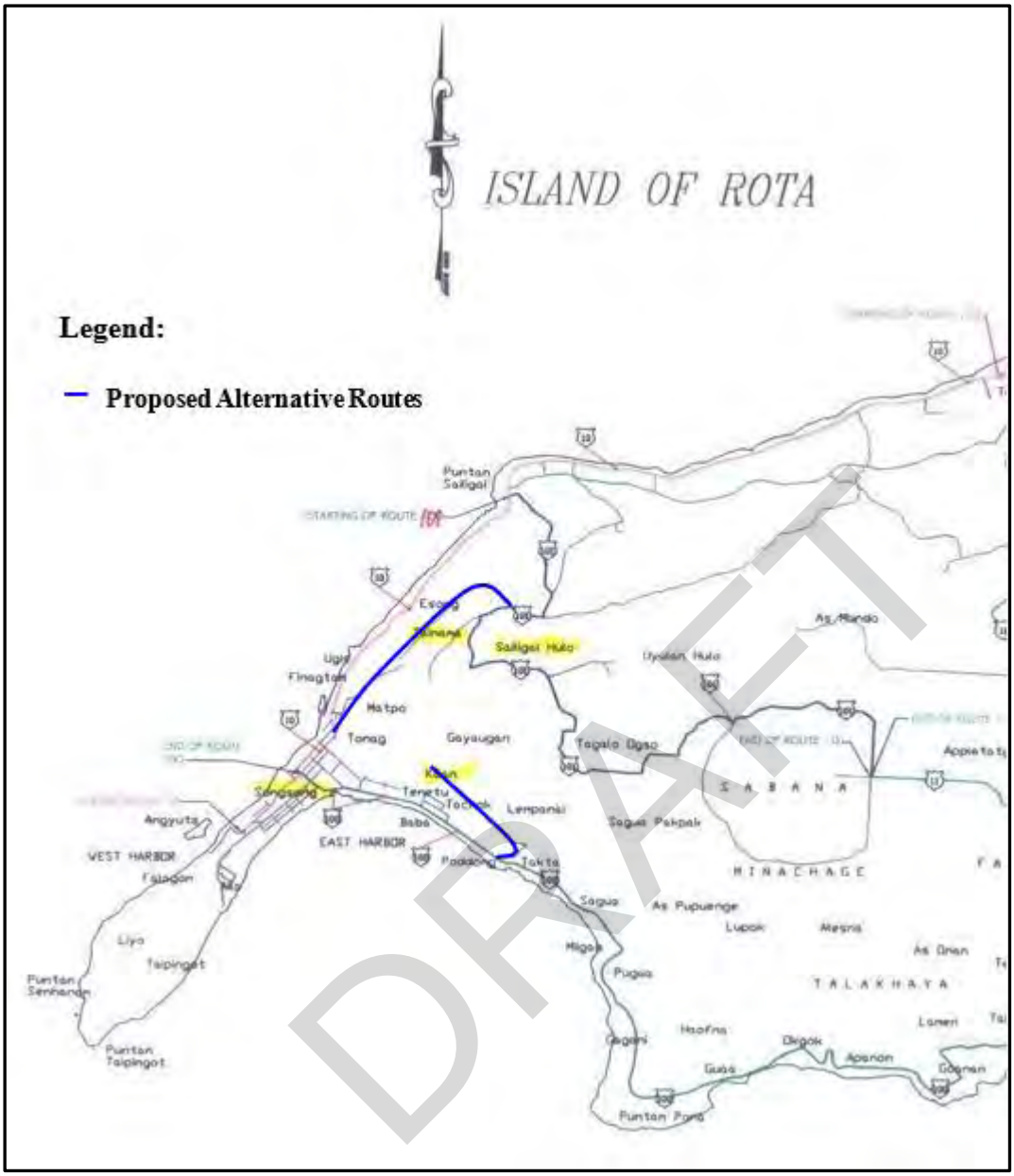
By reviewing the existing infrastructure and its condition, it is recommended that the road that connects the cross at Taimama to Sailigar Hulo and the road that connects Route 100 to Ka’an be considered as the emergency transportation route for the public in Song Song Village. The two proposed alternate routes are shown in the illustration below.

These two roadways are currently unpaved and narrow roads. In order for these roadways to better serve as an emergency transportation routes, upgrades to the roadways are necessary. These roadway upgrades should include widening the existing limited roadway width to allow two opposing vehicles to pass simultaneously, install new asphaltic concrete pavement and new pavement markings, and implementing a roadside signing program for regulatory, warning and guide signs.

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Figure 6-8(E) *RL-9 Recommended Improvements*



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6.6 Cost Estimates

Table 6.14 summarizes the engineer cost estimates for the recommended roadway improvements for the three islands. The estimated total cost is $85.7 million for all the near-term improvements and $188 million for all the long-term improvements. The cost estimate worksheets for the recommended improvements are provided in Appendix X.

Cost estimates are not provided for general improvements.

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Table 6.14 Preliminary Cost Estimates

Island	Time Frame	ID	Location	Improvement	Preliminary Cost
SAIPAN	Near-Term Recovery Conditions Improvements (Near)	**SS-1**	Intersection Modification at the following locations:	-	-
		SS-1a	Route 31 (Chalan Monsignor Guerrero) & Route 30 (Middle Road/Chalan Pale Arnold)	Intersection modification	$241,120
		SS-1b	Route 31 (Chalan Monsignor Guerrero) & Route 33 (Beach Road)	Intersection modification	$241,120
		SS-1c	Route 30 (Middle Road/Chalan Pale Arnold) & Navy Hill Road	Intersection modification	$241,120
		SS-1d	Route 33 (Beach Road) & Garapan Street (Rte 308)	Intersection modification	$241,120
		SS-1e	Route 35 (Tun Herman Pan) & Route 304 (Flame Tree Drive)	Intersection Modification (AWSC)	$3,726
		SS-1f	Route 33 (Beach Road) & Route 37 (Chalan Monsignor Martinez)	Intersection Modification (SSSC)	$2,795
		SS-1g	Route 304 (Flame Tree Road) & Route 32 (As Perdido Road)	Intersection modification (AWSC)	$3,726
		SS-1h	Route 304 (Flame Tree Road) & Route 302 (Naftan Road)	Intersection modification (SSSC or AWSC)	$2,795
		SS-2	New Traffic Signal or Roundabout at the following locations:	-	-
		SS-2a	Route 33 (Beach Road) & Quartermaster Road	Install new traffic signal or roundabout	$2,740,000
		SS-2b	Route 33 (Beach Road) & Route 317 (Gualo Rai Road)	Install new traffic signal	$2,740,000
		SS-2c	Route 33 (Beach Road) & CPL Derence Jack Road	Install new roundabout	$2,740,000
		SS-2d	Route 33 (Beach Road) & Route 38 (Micro Beach Road)	Install new traffic signal	$2,740,000
		SS-2e	Route 31 (Chalan Monsignor Guerrero) & Route 305 (DanDan Road)	Install new traffic signal	$482,240
		SS-2f	Route 31 (Chalan Monsignor Guerrero) & Route 37 (Chalan Monsignor Martinez)	Install new roundabout	$2,055,000
		SS-2g	Route 31 (Chalan Monsignor Guerrero) & Route 35 (Tun Herman Pan Road)	Install new roundabout	$2,055,000
		SS-2h	Route 32 (As Perdido Road) & Route 37 (Chalan Monsignor Martinez)	Install new roundabout	$2,740,000
		SS-3	Route 36	Construct new bridge and connection	Under Construction.
		SS-4	Route 30 (Middle Road/Chalan Pale Arnold) & Commonwealth	Relocate pedestrian signal	$853,000
		SS-5	Chalan Tun Joaquin Doi in As Terlaje	Improve signage and relocate driveway	$17,000
		SS-6	Route 38 (Micro Beach Road), west of Route 30 (Middle Road/Chalan Pale Arnold)	Add pedestrian pathway	$402,000
		SS-7	Lau Lau Road to Kagman	Upgrade and pave roadway	Under Construction.
		SS-8	Garapan (area)	Lighting improvement	$2,138,000
		SS-9	Route 33 (Beach Road)	Add mid-block or signalized crosswalks	$53,000
		SS-10a-b	Improvements at the following locations:	-	$79,000
		SS-10a	Route 31 (Chalan Monsignor Guerrero)	Speed enforcement	-

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Island	Time Frame	ID	Location	Improvement	Preliminary Cost
		SS-10b	Route 30 (Middle Road/Chalan Pale Arnold)	Speed enforcement	-
		SS-11	Garapan	Parking enforcement	$10,000
		SS-12	Garapan	Improve vehicle circulation	$991,000
		SS-13	Route 30 (Middle Road/Chalan Pale Arnold)	Hazard elimination	$6,296,000
		SS-14	Route 306 (Chalan Tun Joaquin Doi) & Texas Road	Add signage	$8,000
		SS-15	Route 38 (Navy Hill Road), near CHCC	Construct pedestrian facilities and bike lanes	$1,132,000
		SS-16	Route 302 (Naftan Road), from Route 304 (Flame Tree Road) to Obyan Route 33 (Beach Road)	Improve roadway	$12,013,000
		SS-17	Route 323 (Industrial Drive), from Smiling Cove Road to Lower Base Drive	Improve roadway	$11,598,000
	Long-Term (2040) Improvements (Long)	**SL-1**	Route 30 (Middle Road/Chalan Pale Arnold) & Monsignor Guerrero	Realign Texas road to form a 4-legged intersection	$7,411,000
		SL-2,3,4	Improvements at the following locations:	-	$1,132,000
		SL-2	Route 38 (Micro Beach Road), between Route 33 (Beach Road) and Route 30 (Middle Road/Chalan Pale Arnold)	Realign Micro Route 33 (Beach Road)	-
		SL-3	Route 38 (Micro Beach Road), between Route 33 (Beach Road) and Route 30 (Middle Road/Chalan Pale Arnold)	Add bike lanes	-
		SL-4	Route 38 (Micro Beach Road), between Route 33 (Beach Road) and Route 30 (Middle Road/Chalan Pale Arnold)	Add pedestrian pathway	-
		SL-5	Route 30 (Middle Road/Chalan Pale Arnold)	Construct pedestrian facilities and bike lanes	$9,744,000
		SL-6	Route 31 (Chalan Monsignor Guerrero), near Route 35 (Tun Herman Pan)	Drainage upgrade	$327,000
		SL-7	Route 33 (Beach Road), from Route 31 (Chalan Monsignor Guerrero) to Afetna	Widen roadway, install two-way left-turn lane	$9,883,000
		SL-8	Route 316 (Chalan Savanna)	Widen and pave roadway	$5,416,000
		SL-9	Route 310 (Tapochao Road) towards Mt. Tapochao	Upgrade and improve roadway	$11,729,000
		SL-10	Beach Road Parkway	Replace piers	Forthcoming.
		SL-11	Route 33 (Beach Road), from Route 31 (Chalan Monsignor Guerrero) to Gualo Rai Road	Coastal reinforcement	Forthcoming.
		SL-12	Route 33 (Beach Road), from Route 38 (Micro Beach Road) to Koblerville Road	Corridor signal optimization	$5,908,000
		SL-13	Route 30 (Middle Road/Chalan Pale Arnold), from Route 38 (Micro Beach Road) to QuaRoutermaster Road	Corridor signal optimization	$3,376,000
TINIAN	Near	**TS-1**	Tinian, especially in San Jose Village	Implement directional and guide sign program	$51,000
		TS-2	Route 21 (Broadway) & Canal Street	Fix roundabout	$2,740,000
		TS-3	Route 21 (Broadway), from Route 201 to Military Retention Zone	Improve roadway	$12,327,000
		TS-4	Route 23 (8th Avenue), from Route 202 to Military Retention Zone	Improve roadway	$12,675,000

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Island	Time Frame	ID	Location	Improvement	Preliminary Cost
	Long	**TL-1**	Broadway, from Route 201 south to Limestone Forest Trail	Upgrade and improve roadway	$5,567,000
		TL-2	Lower Pina, Marpo and Carolinas	Upgrade and improve major roadways	$14,117,000
ROTA	Near	**RS-1**	Rota, especially in Songsong Village	Implement directional and guide sign program	$247,000
		RS-2	Route 10	Hazard elimination	Ongoing.
		RS-3	Route 100, from Bay breeze Restaurant to East Harbor entrance	Install positive traffic control	$247,000
		RS-4	Route 10, within Sinapalo	Lighting improvement	$2,138,000
		RS-5	Route 10 & Route 100	Sidewalk	$402,000
	Long	**RL-1**	Route 10, from Tatachok Point south to Pinatang Park	Drainage upgrade	$129,000
		RL-2	Route 100, from Songsong Village to Ginalahan Community and Airport	Complete, widen, and pave roadway	$33,515,000
		RL-3	Dugi area, from Route 103	Roadway extension, and other infrastructures to Dugi area	$3,788,000
		RL-4ab	Improvements at the following locations:	-	$9,945,000
		RL-4a	Route 10	Construct bike/pedestrian path	-
		RL-4b	Route 100	Construct bike/pedestrian path	-
		RL-5	unnamed roadway, between Gagani and Haofna	Widen and upgrade roadway	$10,542,000
		RL-6	Route 102	Upgrade and pave roadway	$24,993,000
		RL-7	Route 103	Upgrade and pave roadway	$19,669,000
		RL-8	Alternate routes from Songsong Village to Sailigal Hulo and to Ka'an	Upgrade and pave roadways	$10,869,000

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6.7 Project Evaluations

Table 6.16 on the following page ranks the improvement projects for each of the three main islands and for both near and long-term time frames, based on the following five criteria and scores (where higher scores are better):

– Safety (score of 1 for minimal or no safety improvement, 2 for moderate improvement, 3 for substantial improvement, and 4 for exceptional improvement).
– Traffic Operations (score of 1 for minimal or no traffic flow improvement, 2 for moderate improvement, 3 for substantial improvement, and 4 for exceptional improvement).
– Environmental Impacts (score of 1 for potentially severe environmental impacts, 2 for potentially substantial impacts, 3 for potentially moderate impacts, and 4 for minimal to no impacts).
– Construction Costs (score of 1 for construction costs <$250,000, 2 for costs between $250,000 and $1M, 3 for costs between $1M and $10M, and 4 for costs over $10M).
– Operations and Maintenance Costs (score of 1 for potentially very high operations and maintenance cost, 2 for potentially high cost, 3 for potentially moderate cost, and 4 for minimal to no cost).

The top-ranking projects include:

Table 6.15 Top-Ranking Projects

ID	Location	Improvement	Total Score
SS-2c	Route 33 (Beach Road) & CPL Derence Jack Road	Install new traffic signal or roundabout	17
SS-2f	Route 31 (Chalan Monsignor Guerrero) & Route 37 (Chalan Monsignor Martinez)	Install new roundabout	17
SS-2g	Route 31 (Chalan Monsignor Guerrero) & Route 35 (Tun Herman Pan Road)	Install new roundabout	17
SS-2h	Route 32 (As Perdido Road) & Route 37 (Chalan Monsignor Martinez)	Install new roundabout	17
TS-2	Route 21 (Broadway) & Canal Street	Fix roundabout	16
RS-3	Route 100, from Bay breeze Restaurant to East Harbor entrance	Install positive traffic control	16
RS-4	Route 10, within Sinapalo	Lighting improvement	16
SS-9	Route 33 (Beach Road)	Add mid-block or signalized crosswalks	15
SS-15	Route 38 (Navy Hill Road), near CHCC	Construct pedestrian facilities and bike lanes	15
RS-1	Rota, especially in Songsong Village	Implement directional and guide sign program	15

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Table 6.16 Project Evaluations

ID	Improvement	SCORE					
		Safety	Traffic Operations	Environmental Impacts	Construction Costs	Operations & Maintenance	Total Score
SS-1	-	-	-	-	-	-	-
SS-1a	Intersection modification	-	-	-	-	-	-
SS-1b	Intersection modification	-	-	-	-	-	-
SS-1c	Intersection modification	-	-	-	-	-	-
SS-1d	Intersection modification	2	3	4	1	2	12
SS-1e	Intersection Modification (AWSC)	4	2	4	1	3	14
SS-1f	Intersection Modification (SSSC)	3	2	4	1	3	13
SS-1g	Intersection modification (AWSC)	4	2	4	1	3	14
SS-1h	Intersection modification (SSSC or AWSC)	3	2	4	1	3	13
SS-2	-	-	-	-	-	-	-
SS-2a	Install new traffic signal or roundabout	-	-	-	-	-	-
SS-2b	Install new traffic signal or roundabout	3	3	3	3	2	14
SS-2c	Install new traffic signal or roundabout	4	4	3	3	3	17
SS-2d	Install new traffic signal or roundabout	3	3	3	3	2	14
SS-2e	Install new traffic signal	3	3	3	2	2	13
SS-2f	Install new roundabout	4	4	3	3	3	17
SS-2g	Install new roundabout	4	4	3	3	3	17
SS-2h	Install new roundabout	4	4	3	3	3	17
SS-3	Construct new bridge and connection	-	-	-	-	-	-
SS-4	Relocate pedestrian signal	-	-	-	-	-	-
SS-5	Improve signage and relocate driveway	-	-	-	-	-	-
SS-6	Add pedestrian pathway	3	2	3	3	3	14
SS-7	Upgrade and pave roadway	-	-	-	-	-	-
SS-8	Lighting improvement	4	1	4	3	2	14
SS-9	Add mid-block or signalized crosswalks	3	1	4	4	3	15
SS-10a-b	-	3	2	4	4	1	14
SS-10a	Speed enforcement	-	-	-	-	-	-
SS-10b	Speed enforcement	-	-	-	-	-	-
SS-11	Parking enforcement	-	-	-	-	-	-
SS-12	Improve vehicle circulation	-	-	-	-	-	-
SS-13	Hazard elimination	-	-	-	-	-	-

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ID	Improvement	SCORE					
		Safety	Traffic Operations	Environmental Impacts	Construction Costs	Operations & Maintenance	Total Score
SS-14	Add signage	**2**	**1**	**4**	**1**	**4**	**12**
SS-15	Construct pedestrian facilities and bike lanes	**4**	**1**	**4**	**3**	**3**	**15**
SS-16	Improve roadway	**2**	**3**	**2**	**4**	**1**	**12**
SS-17	Improve roadway	**2**	**3**	**2**	**4**	**1**	**12**
SL-1	Realign Texas road to form a 4-legged intersection	**2**	**3**	**1**	**2**	**1**	**9**
SL-2,3,4	-	**3**	**3**	**1**	**3**	**2**	**12**
SL-2	Realign Micro Route 33 (Beach Road)	**-**	**-**	**-**	**-**	**-**	**-**
SL-3	Add bike lanes	**-**	**-**	**-**	**-**	**-**	**-**
SL-4	Add pedestrian pathway	**-**	**-**	**-**	**-**	**-**	**-**
SL-5	Construct pedestrian facilities and bike lanes	**3**	**2**	**2**	**2**	**2**	**11**
SL-6	Drainage upgrade	**2**	**1**	**2**	**3**	**4**	**12**
SL-7	Widen roadway, install two-way left-turn lane	**3**	**4**	**1**	**2**	**1**	**11**
SL-8	Widen and pave roadway	**-**	**-**	**-**	**-**	**-**	**-**
SL-9	Upgrade and improve roadway	**-**	**-**	**-**	**-**	**-**	**-**
SL-10	Replace piers	**4**	**1**	**2**		**2**	**9**
SL-11	Coastal reinforcement	**4**	**1**	**3**		**1**	**9**
SL-12	Corridor signal optimization	**2**	**4**	**3**	**3**	**2**	**14**
SL-13	Corridor signal optimization	**2**	**4**	**3**	**3**	**2**	**14**
TS-1	Implement directional and guide sign program	**2**	**2**	**3**	**4**	**3**	**14**
TS-2	Fix roundabout	**4**	**4**	**3**	**3**	**2**	**16**
TS-3	Improve roadway	**2**	**3**	**2**	**4**	**2**	**13**
TS-4	Improve roadway	**2**	**3**	**2**	**4**	**2**	**13**
TL-1	Upgrade and improve roadway	**3**	**3**	**2**	**2**	**2**	**12**
TL-2	Upgrade and improve major roadways	**3**	**3**	**1**	**1**	**1**	**9**
RS-1	Implement directional and guide sign program	**2**	**2**	**4**	**4**	**3**	**15**
RS-2	Hazard elimination	**-**	**-**	**-**	**-**	**-**	**-**
RS-3	Install positive traffic control	**3**	**3**	**3**	**4**	**3**	**16**
RS-4	Lighting improvement	**4**	**2**	**4**	**3**	**3**	**16**
RS-5	Sidewalk	**4**	**1**	**4**	**2**	**3**	**14**
RL-1	Drainage upgrade	**3**	**1**	**3**	**4**	**3**	**14**
RL-2	Complete, widen, and pave roadway	**3**	**4**	**1**	**1**	**1**	**10**
RL-3	Roadway extension, and other infrastructures to Dugi area	**-**	**-**	**-**	**-**	**-**	**-**
RL-4ab	-	**3**	**2**	**2**	**2**	**1**	**10**

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ID	Improvement	SCORE					
		Safety	Traffic Operations	Environmental Impacts	Construction Costs	Operations & Maintenance	Total Score
RL-4a	Construct bike/pedestrian path	-	-	-	-	-	-
RL-4b	Construct bike/pedestrian path	-	-	-	-	-	-
RL-5	Widen and upgrade roadway	**3**	**4**	**1**	**2**	**1**	**11**
RL-6	Upgrade and pave roadway	**3**	**3**	**1**	**1**	**1**	**9**
RL-7	Upgrade and pave roadway	**3**	**3**	**1**	**1**	**1**	**9**
RL-8	Upgrade and pave roadways	**3**	**3**	**1**	**2**	**1**	**10**

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7 CNMI Financial Plan

7.1 Funding Sources

There are a variety of potential funding sources for the CNMI Capital Improvement Projects (CIP). These include:

1. Covenant Funds
2. Local Revenues
3. Development Fees
4. Department of Interior Appropriation Measures
5. Federal Funds
    a. Department of the Interior
        i. Office of Insular Affairs
    b. Infrastructure Investment and Jobs Act
        i. Federal Highway Administration (FHWA)
        ii. Federal Transit Administration (FTA)
    c. HR2 Moving Forward Act: Surface Transportation Program Funds
    d. Federal Emergency Management Agency (FEMA) (CDBG-DR, too?)
    e. Department of Housing and Urban Development (HUD)
        i. Community Development Block Grant Disaster Recovery (CDBG-DR) Funds
    f. CARES Act (COVID-19 Assistance)
    g. Other Federal funds

7.1.1 Covenant Funds

Section 702 of the Covenant between the United States and the CNMI provides a commitment and pledge from the United States for the payment and an authorization for the appropriation of guaranteed annual levels of direct grant assistance to the Government of the CNMI for a number of years.

In 2005 the CNMI Government and the US Congress negotiated a Covenant Fund package that contains substantial infrastructure project funds for the CNMI. Included in the Act are $11.2 million for Capital Improvement Projects under the 702 Agreement signed in 2003.

The Covenant funds were to be allocated to the territories in a competitive system allowing opportunities to improve accountability and providing incentives for territorial management and financial reforms.

Under this new system the CNMI receives a base amount of $11 million, with an additional $200,000 as an incentive bonus for its good management and timely completion of CIP projects.

The Office of Insular Affairs annually ranks the territories on 13 criteria which are scored to determine the annual allocation of funding among the insular area grantees.

“The management criteria include the status of audits, quality of financial and grants management, and compliance with procurement rules. There are also project criteria, including how well each proposed project support economic development goals and objectives, whether a project has measurable objectives, if it has measurable milestones, and if the project has detailed cost estimates that are within budget targets.” (Source: Saipan Tribune, Aug 13, 2005).

For example, of the total amount budgeted for Covenant funds for FY 2006, the CNMI was to receive $5.171 million in Compact Impact funding under this budget as authorized in the 2003 renegotiated compact funding agreement.

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For these budgeting purposes in this Comprehensive Highway Master Plan Update, it is assumed that approximately 15% of the total Covenant fund could be used for projects in the CNMI Comprehensive Highway Master Plan Update.

7.1.2 Local Revenues and Development Fees

Historically, locally generated revenues and development fees have only comprised a small proportion of the total funds used for roadway improvement projects, largely because of the substantial amount of available covenant funds. However, there are substantial amounts of money generated through these sources, and even a small shift in the overall allocation of current funds would generate substantially more funds of highway capital improvement projects.

According to William H. Stewart a forensic economist, historian, and military cartographer. (Source: Saipan Tribune, January 19, 2007), during the period 1986 to 2004 the CNMI government's internally generated revenue was $3.07 billion. During this period the total expenditures on capital improvement projects in the Commonwealth as generated by their own internal sources was a 3.2-percent ($78.4 million). Over the above period, other government expenditures were wages and salaries of $1.6 billion (64-percent) and all other expenditures of $807.5 million (32.8-percent). The vast majority of the total expenditures made on capital improvement infrastructure projects resulted not from locally generated revenues but largely as a result of U.S. financial assistance in the form of program grants and loans and Covenant Funds. Over the period 1986 - 2004 the total reported business gross revenue generated by the private sector was $31.3 million."

7.1.3 Department of Interior Appropriation Measures

Each year the CNMI Legislature passes appropriation measures for infrastructure improvements for roads, water, sewer and power.

The Department of Finance estimates gross budgetary resources to reach $169.55 million in fiscal year 2009, which runs from Oct. 1, 2008 to Sept. 30, 2009. However, some $3.67 million of this amount is earmarked to tobacco control, solid waste management, and the deportation fund. In addition, $7.47 million will go to payment of debts. This leaves $158.4 million available for appropriations. (Source: Saipan Tribune, April 8, 2008).

7.1.4 Federal Funds

CNMI receives financial assistance from the US government by basis of it being considered an insular territory. Federal funding to CNMI includes consistent streams of funds available for transportation improvement projects through the Department of Transportation (DOT). Additional funds have been made available through the Department of Housing and Urban Development, in response to specific events, including the 2018 typhoons and the COVID-19 pandemic. Financial assistance for transportation projects and programs is provided via formula grant programs or competitive grant programs. The following is a list of Federal funding sources that have been made available to CNMI to address a range of transportation needs.

Infrastructure Investment and Jobs Act (2021)

The Infrastructure Investment and Jobs Act was signed in 2021 and makes available $550 billion in new spending for transportation infrastructure and services for fiscal years 2022 through 2026. Applicable projects to receive funding include roads, public transit, rural broadband, airports, water and wastewater systems, and other traditional capital improvement projects. Funds are distributed to recipients through formula grant programs or competitive grant programs.

Funding programs that are available to CNMI to fund transportation projects include:

- Territorial Highway Program: These funds are available through grants and support the construction and improvement of highway and critical collector roadways.
- Highway Safety Programs: These funds are apportioned using statutory apportionment formula and are based on improvements documents in an approved highway safety plan that identifies countermeasures to help reduce motor vehicle collisions.

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- National Priority Safety Programs: These funds are apportioned using statutory apportionment formula and are aimed at reducing highway deaths and injuries through educational and legal programs.

National Highway Freight Program (NHFP)

This program allocated funds for investments in infrastructure and operational improvements that strengthen economic competitiveness, reduce congestion, reduce the cost and environmental impacts of freight transportation, improve reliability and safety, and increase productivity.

Coronavirus Aid, Relief, and Economic Security (CARES) Act (2020)

The CARES Act was signed in 2020 to provide over $2 trillion of economic relief to address the impact created by the Coronavirus Disease 2019 (COVID-19). Fiscal Year 2020 appropriations that were made available to CNMI include the Federal Transit Administration (FTA) and Federal Aviation Administration (FAA). Under the CARES Act, the US Department of Transportation (DOT) allocated more than $1 million in FTA funds to help the CNMI public transportation systems and more than $22.7 million in FAA funds for continuing operations and lost revenue for airports in CNMI.

Community Development Block Grant – Disaster Relief (CDBG-DR)

In 2020, the Department of Housing and Urban Development (HUD) allocated $244 million in Community Development Block Grant – Disaster Recovery (CDBG-DR) funds to assist CNMI in recovering from severe damage caused by two typhoons in September and October 2018. The majority of these funds must be used to support activities benefiting low- and moderate-income persons and to primarily consider and address unmet housing needs.

Office of Insular Affairs (OIA)

The Office of Insular Affairs (OIA) oversee Federal funding assistance to territories under the jurisdiction of the Department of the Interior, including the Commonwealth of the Northern Mariana Islands (CNMI).

The Office of Insular Affairs (OIA) under the Department of the Interior has administrative responsibility for coordinating federal policy in certain US territories, including CNMI. OIA programs provide assistance in the form of direct grants, reimbursable agreements, and contracts with technical assistance providers to respond to urgent, immediate needs in the insular areas.

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8 Summary & Recommendations

This Comprehensive Highway Master Plan updates the previous Comprehensive Highway Master Plan that was published in 2008. It provides updated traffic data, and forecasts for future year conditions for each of the three main islands. Roadway segments and intersections were analyzed to estimate traffic capacity and levels of service.

This Master Plan reassesses previous accident data and provides the status of the recommended improvements from the earlier master plan.

Based on public scoping meetings and interviews and discussions with DPW and other CNMI staff, further deficiencies and constraints in the existing roadway network were identified, and recommendations made for improvements.

To maintain the mobility on the islands, the identified improvements are divided into long-term and near-term recommendations. The designated timeframe for long-term improvements would be from 5 to 10 years whereas the designated timeframe for near-term recommendations would be from 1 to 4 years. Recommended improvements are provided both on a project-wide basis for all three CNMI islands and specific roadway improvement projects for each of the three islands.

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